JANUARY 9, 1956

STEEL

The Metalworking Weekly

A PENTON PUBLICATION

How To Pay Salesmen

Capital goods makers find tailor-made plans needed to fit fair compensation into sales cost curve . . . **page 27**

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THE Case OF THE RECALCITRANT TUBE

FACTS: High pressure, high temperature refinery application (hydrogenation of petroleum)
Tubing in question was stainless type 347
Tubing met original specification for job

CLUES: Tubing was in service for about 100 hours at a pressure of 10,000 psi and a temperature of 1100 F, before failure.

EXAMINATION REVEALED: Temperatures and/or pressures used in actual testing or operation exceeded the original specifications

Failure resulted from progressive wall thinning due to creep

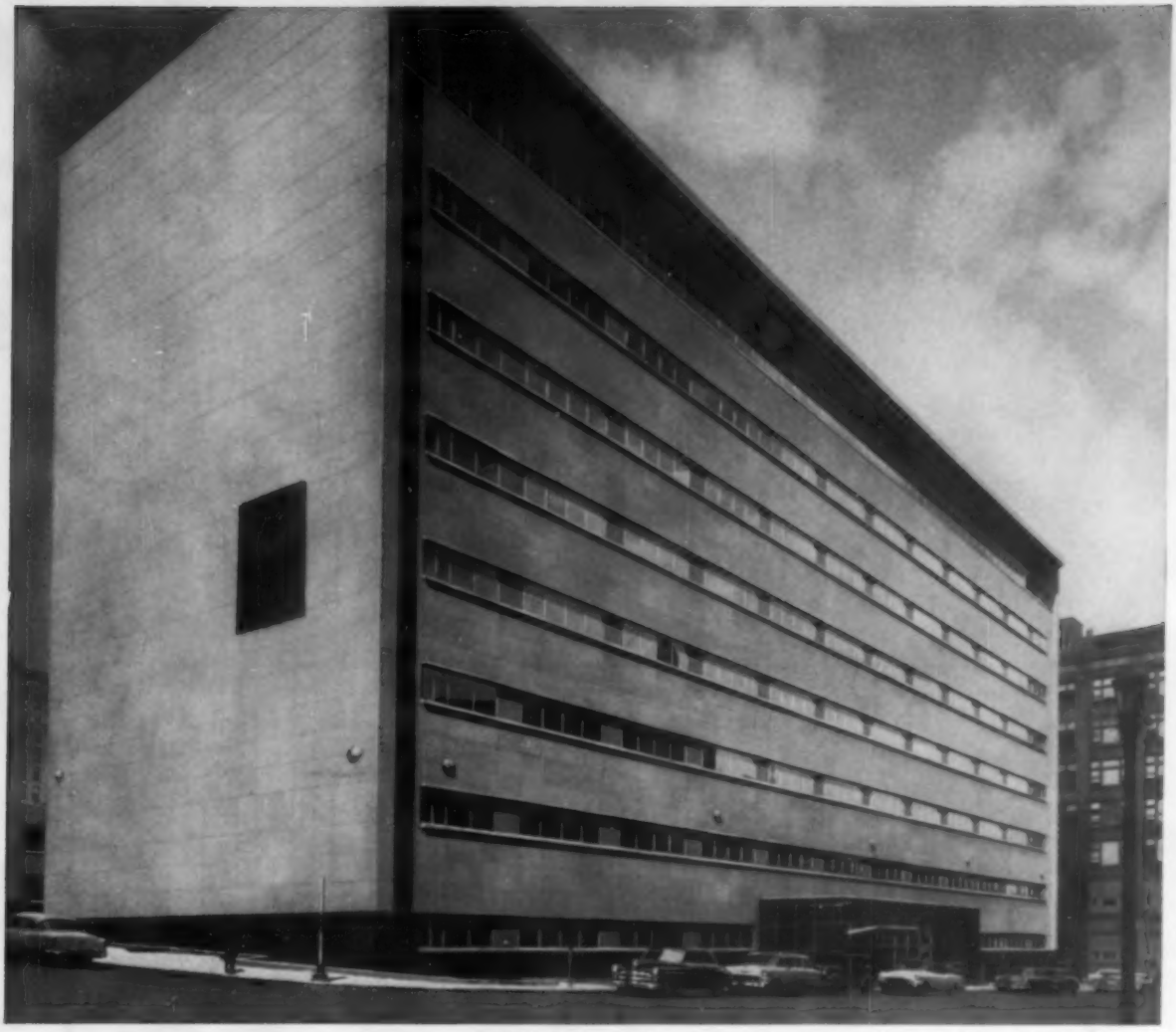
POSSIBLE SOLUTIONS: Change operating conditions
Use a thicker wall tube. Change tube material

B&W SUGGESTION: When it comes to choosing a tube, consider *every* factor involved, including possibility of exceeding current service conditions. *And* get the benefits of Mr. Tubes' long experience with tubing for every kind of application. He knows his tubes—what they will and what they won't do. Call him in at any time. He's as close as the phone at your elbow.

TA-3044 P

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION, BEAVER FALLS, PA.

Seamless and Welded Tubular Products, Seamless Welding Fittings and Flanges—in Carbon, Alloy and Stainless Steels



Architect: Ellerbe and Co.; *General Contractor:* Wm. Baumeister Construction Co.; *Fabricator:* St. Paul Structural Steel Co.; *Erector:* N. H. Sandberg Erection Co. — all of St. Paul.

THEY USED BOLTED JOINTS FOR NEW BUILDING IN ST. PAUL

This block-long structure, completed recently at Victory Square in the Loop, St. Paul, is the head office building of Minnesota Mutual Life Insurance Company. The 8-story Kasota stone building has a steel framework of 1,122 tons. The structural members are joined by approximately 22,000 Bethlehem High-Strength Bolts.

Bethlehem High-Strength Bolts are ideal for joining structural members because of the saving they make possible in erection time. They are quickly installed by means of a calibrated pneumatic impact wrench, which applies sufficient torque to provide permanently tight joints. Besides, the wrench is far less noisy than a riveting gun, making high-strength bolting particularly desirable for construction near hospitals and schools, and in other areas where noise is especially objectionable.

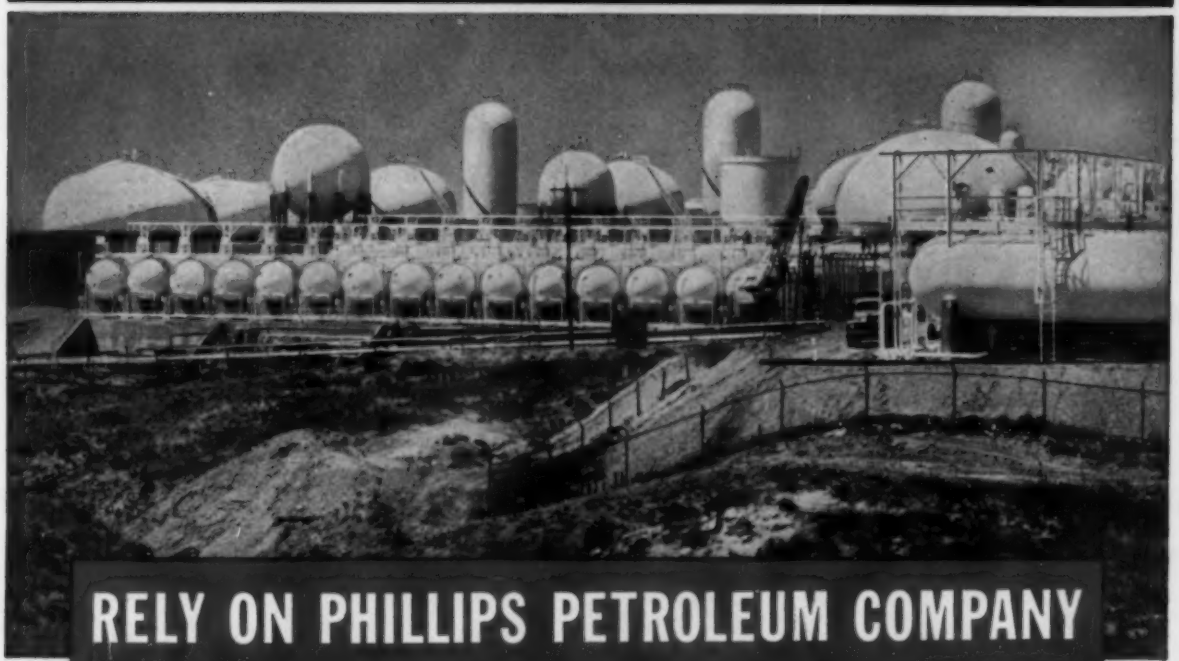
Bethlehem High-Strength Bolts are made of carbon steel, are heat-treated by quenching and tempering, and meet the requirements of ASTM Specification A-325.

Why not let one of our engineers explain in detail the advantages of using Bethlehem High-Strength Bolts? A call to the nearest Bethlehem sales office will bring him to your desk promptly. Or write direct to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Philgas® IS AMERICA'S LARGEST SELLING LP-GAS



RELY ON PHILLIPS PETROLEUM COMPANY FOR DEPENDABLE SUPPLY!

Phillips tremendous manufacturing, transportation and storage facilities provide dependable supplies of Philgas when and where you need it, even in periods of peak demand. The modern processing plant pictured above is one of Phillips many installations engaged in the manufacture of Philgas. Pipelines carry Philgas to strategically situated underground storage facilities. Phillips maintains its own fleets of tank cars and trucks to insure prompt deliveries.

There is no cleaner fuel than Philgas. This quality LP-Gas is produced and processed by Phillips Petroleum Company to rigid standards of purity. It is free from harmful contaminants. You can rely on it for high thermal values, uniform gravity and pressures. In addition, the automatic features of a Philgas system keep your labor costs low.

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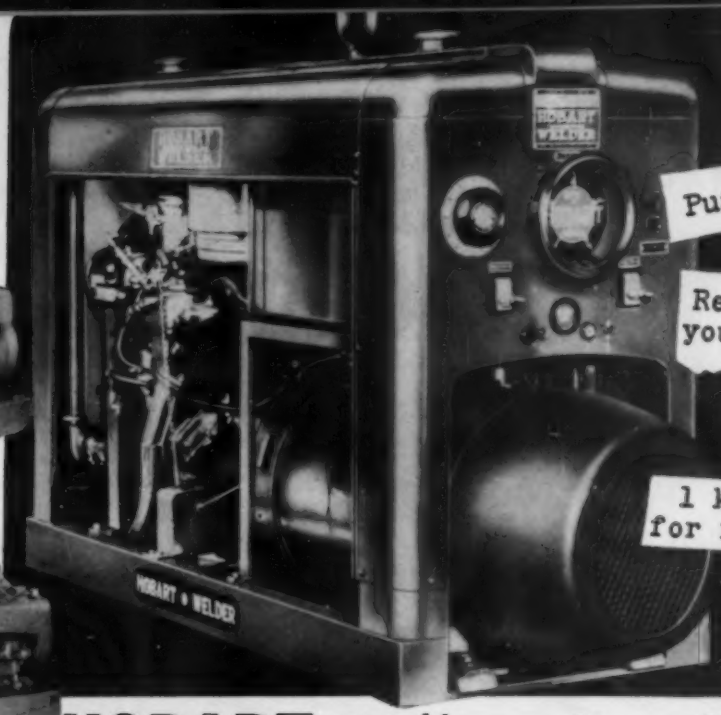


A Profitable New ARC WELDER

Push Button–Self Starting

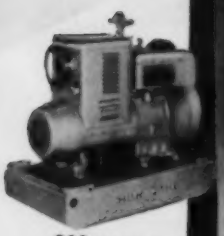
WELDS ANYWHERE

Ready to go to work for you on a moment's notice

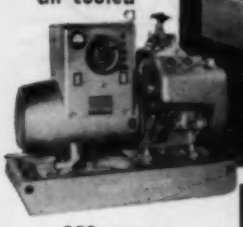
Dual Control

1 kw DC Auxiliary Power for running Tools & Lights

RUGGED DESIGN for the TOUGH Jobs

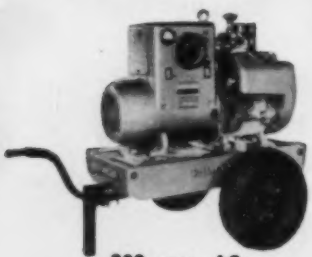


200 amp. "Husky Boy" air cooled

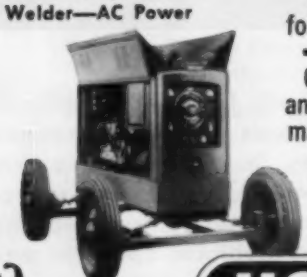


250 amp. "Big Brother" air cooled

HOBART 250 amp. "contractors special"



200 amp. AC Welder—AC Power



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Hobart offers A COMPLETE LINE of welders with "extra" and added built-in features to do specific jobs.

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Without obligation, please send me complete information on items checked:

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☐ AC Welder-AC Power ☐ Portable Gas Drive

Our work is_____

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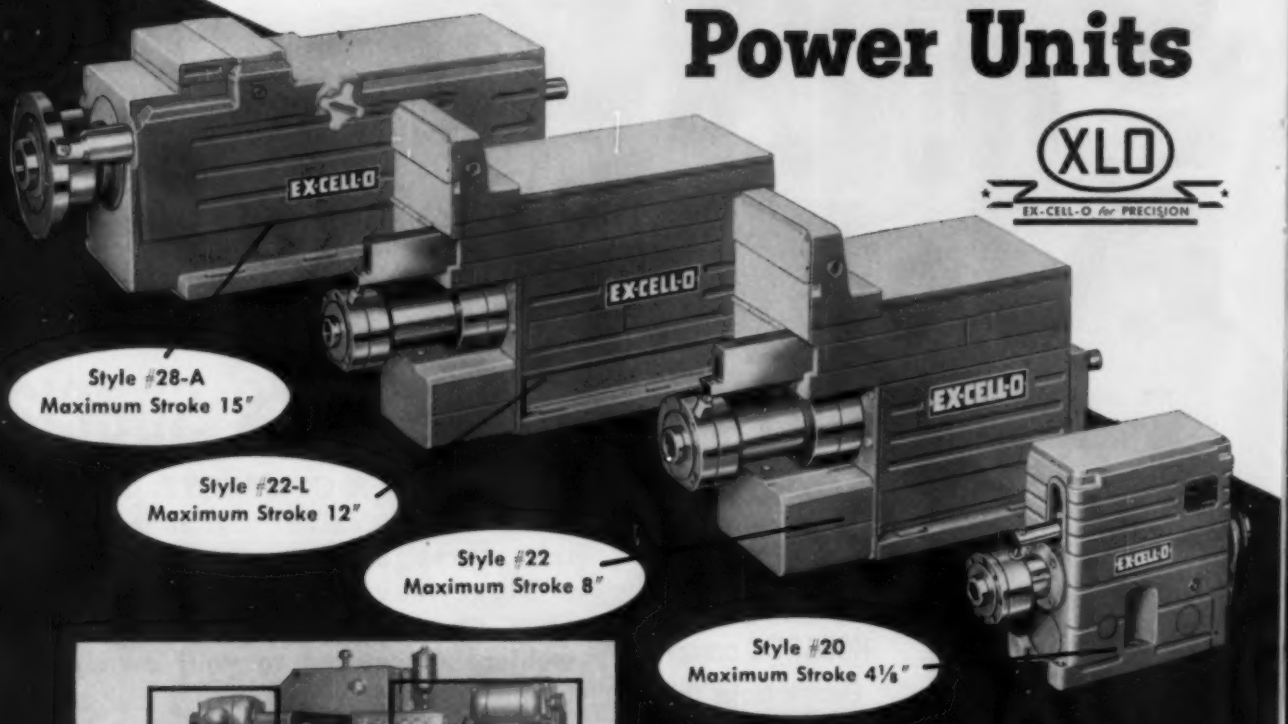
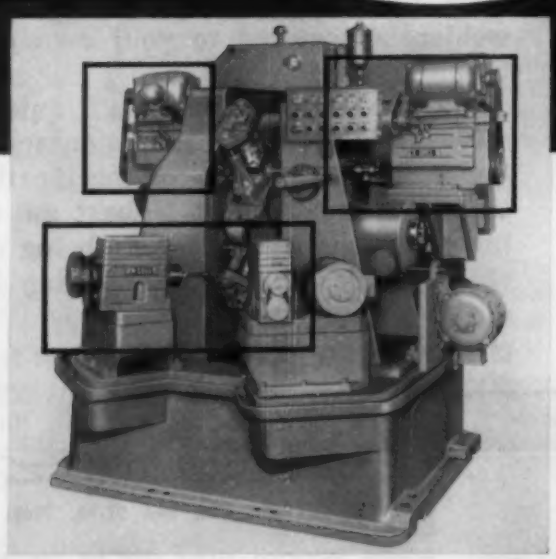
FOR AUTOMATIC CYCLES IN PRODUCTION MACHINES:

Ex-Cell-O Quill-Type Power Units

XLO
EX-CELL-O for PRECISION





This special machine with automatic indexing fixture core-drills piston pin holes and drills angular oil holes. It uses six Ex-Cell-O Power Units (shown without belt guards) operated from a central push-button station.

Ex-Cell-O Hydraulic Power Units feed and rotate cutting tools in easily controlled automatic cycles. They actuate single tools or multiple spindle heads for such operations as drilling, reaming, counterboring and spot-facing. Hydraulic operation provides smooth, powerful movements.

A machine utilizing Ex-Cell-O Power Units can be very simple, with manual loading and clamping. Or it can be designed with work handling equipment for automation . . .

For complete information, including specifications and installation drawings, ask your Ex-Cell-O Representative or write Ex-Cell-O in Detroit.

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STEEL
The Metalworking Weekly

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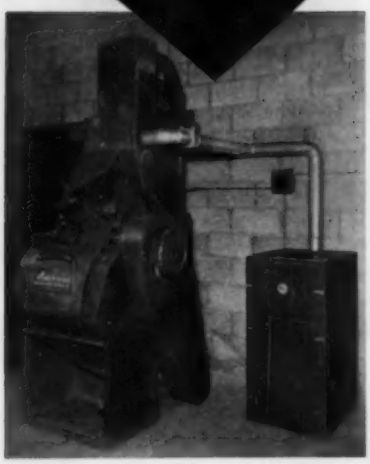
how to trap dust
that damages your machines and hurts company morale



easy-to-move
TORIT DUST COLLECTORS
trap dust at its source!

Untrapped dust costs you money, "secretly" forces precision machines out of line, limits production. Torit dust collectors are unitized for custom installation—save more money, usually more efficient than central (built-into-the-building) system. Torit unit operates only when machine or combination of machines it protects are in use. Filtered air may be returned to room to save heat. Many models and sizes, all self-contained, easy to move. Write today to... DEPT. 506.

TORIT MANUFACTURING COMPANY

Sweet's

311 Walnut Street
St. Paul 2, Minn.

behind the scenes

Prexy Shies at Scroll

Three days after Christmas, George O. Hays, president of The Penton Publishing Co., might have been observed sitting quietly at the speakers' table in the Petit Cafe of Hotel Carter, Cleveland.

President of the company that publishes STEEL, Mr. Hays had been invited to address his associates on "The Editorial Job Management Expects," and he was glancing surreptitiously at his notes while Editor Irwin Such went through the motions of introducing him.

Everybody there knew Mr. Hays, of course, and he knew them; so he sat calmly, fully relaxed, like a seasoned fighter waiting to bound at the bell.

But soft! What cometh to ruffle the presidential calm, to shake the managerial equilibrium?

A hand-lettered, framed tribute of appreciation to George O. Hays from the editorial staff of STEEL, that's what cometh.

You could have knocked Mr. Hays down with a stack of Yearbooks when Editor Such, remarking that Mr. Hays had rechristened the old *Iron Trade Review* twenty-five years ago, began to read from the scroll:

Staff Pays Tribute

"A tribute to George O. Hays, president of The Penton Publishing Co. . . .

"For your vision in discerning the dramatic evolution in the iron and steel and metalworking industries . . . for your foresight in appraising what those far-reaching changes would mean to STEEL . . .

"For your courage in effecting the transition from *Iron Trade Review* to STEEL twenty-five years ago . . . for your wisdom in formulating policies that would provide STEEL new dimensions for growth . . .

"For your leadership in guiding STEEL and The Penton Publishing Co. to greater prestige and prosperity . . . for your inspiration to all of us . . .

"Presented on behalf of the editorial staff of STEEL."

This completely unexpected tribute caught the guest of honor offbalance. He spread his notes before him, but, alas! They carried nothing about STEEL's twenty-fifth birthday, or his part in providing the new name for the magazine.

He looked at the scroll, and he looked at the ceiling, and he looked at his associates, and we had the feeling that he wished he were somewhere else. Presently, he admitted that he viewed the tribute with mixed emotions, "like a man watching his mother-in-law driving his new Cadillac over a cliff."

Notes Soaked Notes

Launching at length into his prepared talk, he recovered composure as he went along. In fact, when he really got going, he inadvertently knocked a glass of water all over his notes.

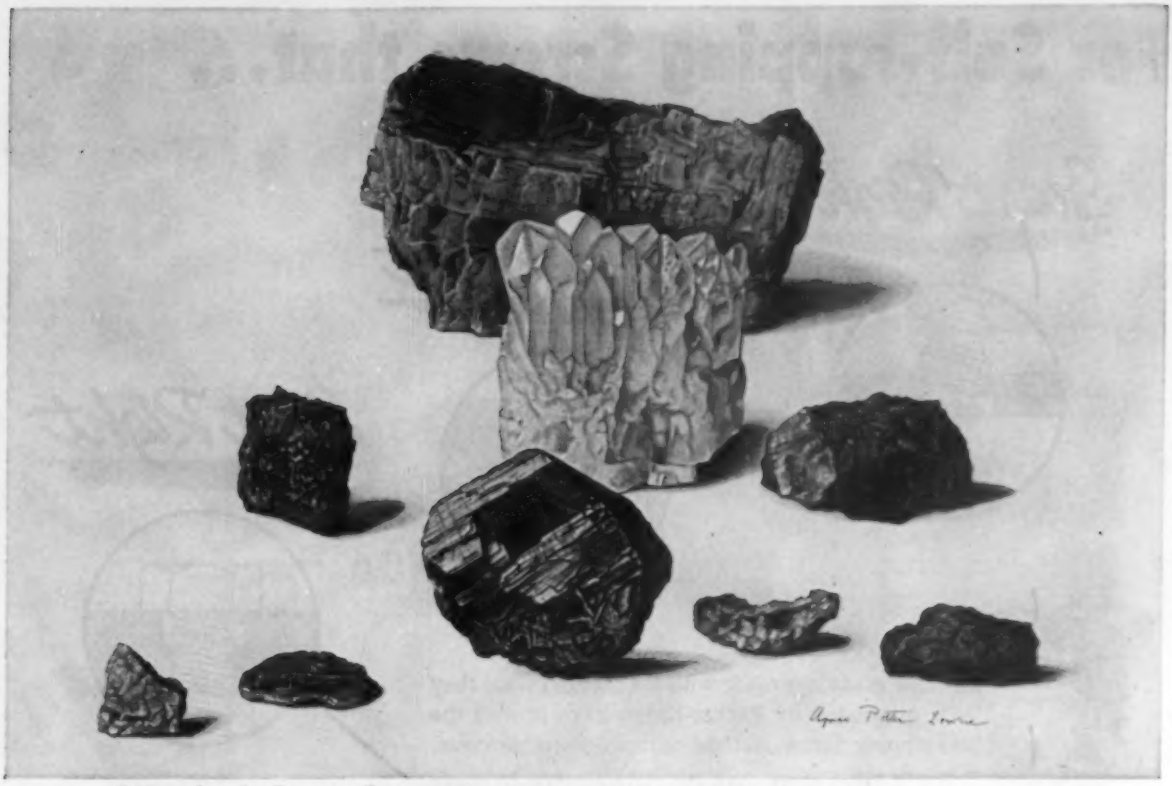
In times of crisis the man who is master of himself is master of the situation. Instantly evaluating his position, Mr. Hays paused, grinned amiably, and quipped: "Since most of my notes are ruined, you may get away sooner than you think."

With easy informality, he concluded his address by cautioning editors to cultivate and promote ideals, ability, honesty, integrity and leadership.

And, shucks, folks, that's what makes men as well as magazines. The editorial job, then, that management expects of STEEL is the job you've come to expect yourselves; and by listening to a re-declaration of aims and principles, the editorial staff is off to a flying start in the new year.

Shrdlu

(Metalworking Outlook— Page 21)



"Alloys for the Furnaces." Agnes Potter Lowrie depicts the ingredients which give steel its special qualities: reddish manganese for deeper hardening; ice-white quartz for flux, flanked (left) by tungsten and (right) by chrome, corrosion preventives for special-purpose steels; dusky lead glistening with molybdenum which maintains hardness at high temperatures; and (bottom row) samples of nickel, molybdenum and chrome, vanadium, copper.

The Fine Art of Steel Making

Advances in metallurgy have given us *finer* steel than ever before, harder, finer-grained, more resistant to heat, friction, corrosion.

Advances in mechanics have given us *more* steel. Today's four-high mill, for instance, rolls more steel in a single shift than the old-time hand mill produced in a week.

Contributing mightily to more efficient production are equal improvements in the materials which smooth the process of steel making — Ironsides roll neck and roller bearing lubricants.

Roll neck shield, once applied by hand, is now supplied in liquid and semi-liquid form for continuous application by automatic pressure systems. Roll necks may be kept at constant temperature; the roller need not adjust his mill to maintain proper gauge.

More important, roll neck shield is formulated to the special needs of the individual user. For example, to compensate for local water and temperature conditions or to meet personal preferences of mill superintendents.

Roller bearing shield, an extreme pressure lubricant, has load-carrying capacity in excess of bearing manufacturers' standards, assuring a safety factor for peak loads. It carries the approval of all top bearing makers.
Today almost every major steel producer uses Ironsides lubricants. Our unique position is due to our ability to formulate for special applications and supply those formulas in any quantity.

We like tough problems; we've solved a lot of them. For example, Palmoshield, replacement for palm oil and most significant advance in lubrication since World War II. If you have a problem, we'd like to help lick it. A letter will summon one of our research engineers. The Ironsides Co., Columbus 16, Ohio.

SHIELD PRODUCTS

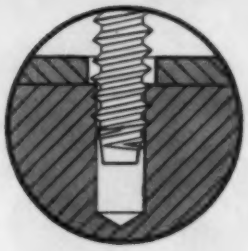
Ironsides

By the makers of Palmoshield • "the palm tree that grows in Ohio"

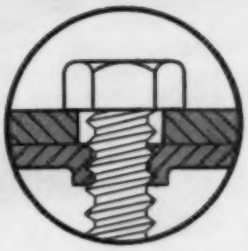
For Self-tapping Screws that...

Start Right

Drive Right



Seat Right



Millions in savings made with P-K Screws since they were originated by Parker-Kalon have proved the Self-tapping Screw *method* reduces assembly costs.

But it takes more than the right method to make sure planned savings pay off. It takes P-K quality standards to guard against defective screws that cause assembly trouble, costly damage to parts, and hidden weakness that shows up in customer complaints.

Only Parker-Kalon can offer P-K quality, the indispensable extra, along with the proved advantages of Self-tapping Screws.

Plan your assemblies for lowest cost . . . a P-K Assembly Engineer will help you. Then make sure *planned* savings *keep on paying off* . . . when you purchase, order "P-K". Parker-Kalon Division, General American Transportation Corporation, Clifton, New Jersey.

Stay Tight

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The First **SELF-TAPPING SCREWS**

originated by P-K . . . and *first* today . . .
the leading choice for fastening economy

Remember **P-K** means **OK**

It's Super Safe...
It's Super Sharp...
It's Super Strong...

IT'S THE HAND HACK SAW BLADE THAT WILL NOT SHATTER!

Twin to Disston's famous non-shatterable machine blade, here's the hand hack saw blade that meets your rigid requirements for safety.

It's shatterproof—made of high speed steel with hardened cutting edge, a super-safe blade that combines the long cutting life of high speed steel with maximum flexibility.

Ask your Disston distributor today for a demonstration of this new super-safe blade with Disston's No. 368 frame.

Henry DISSTON DIVISION

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126 Tacony, Philadelphia 35, Pa.
Other factories and branches:
Toronto, Ont.; Seattle, Wash.; Chicago, Ill.

the right blade makes all the difference.

Ask your Disston distributor for your free Hack Saw Blade Selector . . . handy guide for choosing the right blade type for every job . . . or write Disston Division.

A PLEDGE

from Henry DISSTON DIVISION

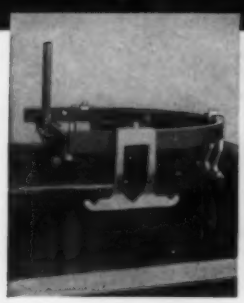
Today as a proud division of H. K. Porter Company, Inc. we pledge ourselves to continue to provide the fine tools and fine steel for which the Disston name has been famous for over a century. You can count, too, on outstanding service from our engineering and distributors' staffs.

HKP DISSTON

THE CYCLEMASTER

by UDYLITE

for High Production . . . Lower Cost Plating



Special alloy carriers for high conductivity.

Variable rack spacing —one man operation.

Compact design requires minimum floor space.

The Udylite Cyclemaster is a new, completely automatic plating machine which offers the greatest production of any machine built with comparable floor size.

A versatile, standardized machine, it is adaptable to most plating processes. The initial cost is low, considering its high production capacity. One man can keep it operating at full capacity.

The Cyclemaster will handle up to 120 racks per hour and take a rack up to 16" by 36". Being only 14 feet, 6 inches in length and moveable, it will fit into most straight line production operations.

All Cyclemaster units are equipped with a new multi-purpose carrier which can be used for double or single spline racks. Made of special alloy metal, it has high structural strength and highest conductivity.

Built on a rugged steel base, it is easily moved and installed. It can be shipped as a complete unit or in two sections which require only bolting together.

Like all Udylite automatics, the Cyclemaster is completely assembled at the factory and run in before being shipped. Each machine incorporates Udylite features of design and construction that have been so well accepted by the plating industry. The drive is hydraulic.

For more details of the Cyclemaster—or any other Udylite equipment—consult your local Udylite representative or write today to The Udylite Corporation, Detroit 11, Michigan.

THE Udylite CORPORATION

WORLD'S LARGEST PLATING SUPPLIER

LETTERS
TO THE EDITORS

Manufacturer Asks Question

This regards your article, "Air Force Shifts Tool Plans" (Dec. 5, page 83).

In one paragraph, you mention: "Other tools to be bought are: Skin millers, profile millers, etc." Further on, you say: ". . . orders for a lot of skin millers will be canceled." We wonder if you mean *spar* millers instead of *skin* millers might be canceled.

Since our line consists of large skin and spar millers, we are naturally concerned with your article. We would appreciate clarification of this matter.

R. F. Onsrud
President
Onsrud Machine Works Inc.
Niles, Ill.

• *We interpret our information to mean that the Air Force still is in the market for skin milling machines, but in a smaller scale than was listed in the old budget.*

Supervisors and Wildcats

Please send three copies of your article, "How To Tame Wildcats" (Oct. 3, page 37). This article is interesting and could be useful for other supervisors in the department.

James Chisholm
Asst. Superintendent-Blast Furnaces
Fairless Works-Central Operations
U. S. Steel Corp.
Fairless Hills, Pa.

A Christmas Story

It is true—as you say in the article, "Santa Comes to Industry" (Dec. 12, page 59)—that the ole' time Christmas party given to employees is fading away. Perhaps this is a good sign. They promoted nothing but drunken behavior and ill feelings, plus some accidents in the plant (as well as on the highway after party participants got behind the wheel of a 250-hp automobile).

I have a story I would like to tell you.

Our president, H. A. Cook, has held Christmas parties for a number of years for the children and families of our employees. Gifts are distributed to the children, and coffee, soft drinks and cookies are served—nothing else.

Aside from the children receiving their gifts and having a good time, each employee gets an opportunity to introduce his family to the other employees, including those holding key positions in the company, whether they be a foreman, supervisor or on the managerial level. From these introductions, the employee becomes an individual with a home and family, not just Joe Doakes.

Tours are conducted through the plant, which enables the employee to

(Please turn to page 12)

announcing

Industrial Brownhoist rubber-tired diesel electric cranes

electric travel, electric rotation!

25 to 60 ton capacities!

Designed and built by Industrial Brownhoist Corporation for mines, quarries, railroads, steel mills, the lumber industry and other large manufacturing plants that require mobile materials handling equipment in heavy duty capacities, Brownhoist's first Diesel Electric Wagon Crane is now in production. Available in capacities from 25 to 60 tons, the new wagon crane will be equipped with dynamatic clutch, anti-friction bearings at essential points, and power steering. It employs electric travel and electric rotation. Mounted on a 12-wheel crane carrier capable of speeds up to 8 miles per hour, the unit can be operated by one man from easy-to-reach crane and carrier controls. Rigorous tests indicate that the new machine provides economical operation and insures added savings of time and labor in heavy duty materials handling work. For complete details, consult a Brownhoist representative or write us today.

BROWNHOIST MATERIALS HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN DISTRICT OFFICES: New York, Philadelphia, Washington, Cleveland, Chicago, San Francisco, Montreal • AGENCIES: Detroit, Birmingham, Houston

SUBSIDIARY OF Penn-Texas

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BROWNHOIST

❶ Proven, Westinghouse-manufactured, extended surface heating coils good for continuous operation up to 200 psig.

❷ Die-formed casings with rounded corners eliminate accidents and dirt catching pockets. Front and back panels easily removable.

❸ Multiple louvered outlets for efficient distribution of heated air.

❹ Self-aligning, grease-lubricated ball bearings mounted outside casing readily serviceable.

❺ Face and by-pass dampers permit continuous air circulation to maintain uniform temperatures.

NOTE: Louver-type mixing box accessory permits introduction of fresh air for make-up and ventilation, with or without filters.

Westinghouse...The Unit Heater for General Purpose and Heavy Duty Industrial Heating

★ These rugged units available in 24 sizes, 8 coil selections, 150 ratings—from 100,000 to 2,500,000 BTU/hr., capacities from 2000 to 25,000 CFM each.

★ GENERAL PURPOSE HEATER . . . For manufacturing areas, warehouses, garages, commercial buildings —with standard non-ferrous heating coils.

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J-80451

LETTERS

(Concluded from page 10)

show his family the work that he does and the products that are made. This helps the other half of the family to understand and to be more interested in the employees' part in the products made.

We all know it is much easier to understand a man when you know of his problems and he, in turn, understands yours. All in all, I recommend that more companies apply this attitude. It is well worth the money spent in promoting excellent employee-management relations (which no money in the world can buy).

Paul C. Marrone
Manager of Operations
Airpax Products Co.
Baltimore

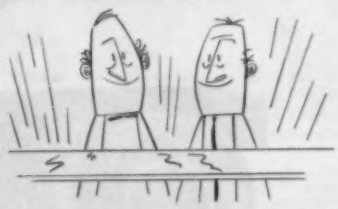
Recognition Pleases Officer

I am delighted with the article, "Shell Making with the New Look" (Dec. 19, page 89), and its effective layout of illustrations. This type of recognition pleases us, and we feel that the article is most comprehensive and favorable to our shell manufacturing plant.

I would like 24 tear sheets to use in our local plant history and files and to route to our key personnel.

Lt. Col. Albert H. Nettleship
Commanding Officer
Louisiana Ordnance Plant
Shreveport, La.

How To Chromize



In the Nov. 28 issue, is an article, "War on Wear" (page 98). On page 99 of this article is mentioned a technique called "chromizing." Where may we get further data on this technique?

John E. Munn
Chief Engineer
Oliver Iron & Steel Corp.
Pittsburgh

• *See the story, "Putting Chrome on Ferrous Surfaces" (Dec. 7, 1953, page 160).*

Employers To Say Whoa?

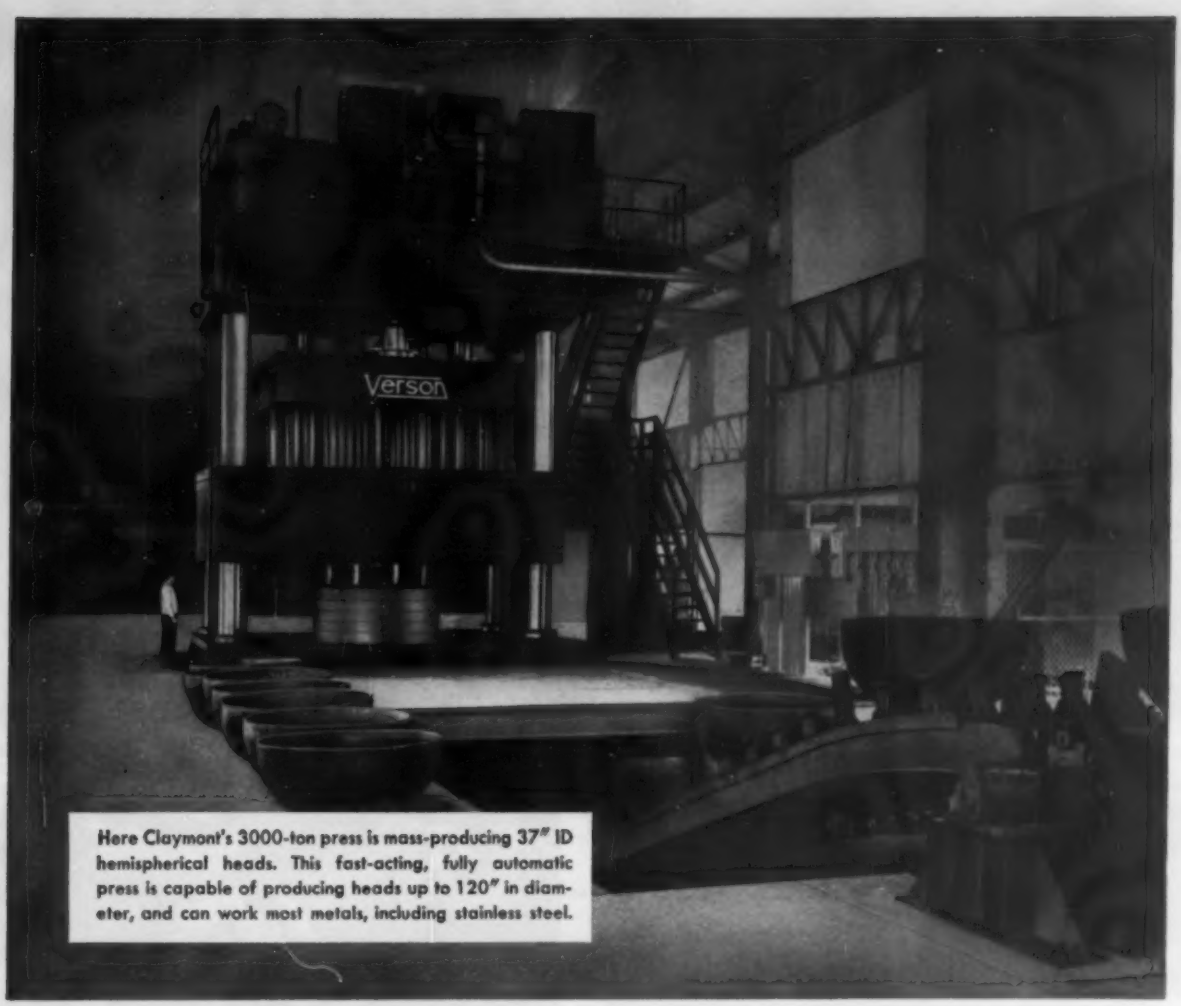
I noted the article, "Next Year's Labor Outlook" (page 55), as the Dec. 12 issue made the rounds here.

Like you, in recent days I have had a feeling that business may be "topping out" and that 1956 may see more employers hollering "whoa" regardless of what the steel industry does.

J. W. Vanden Bosch
Mgr.-Statistics & Business Information
Chamber of Commerce
Cleveland

This was most interesting and appreciated. We would appreciate several copies for distribution to interested personnel.

Harry H. Michaels
Personnel & Security
Ryan Industries
Division of Textron American Inc.
Detroit



Here Claymont's 3000-ton press is mass-producing 37″ ID hemispherical heads. This fast-acting, fully automatic press is capable of producing heads up to 120″ in diameter, and can work most metals, including stainless steel.

CLAYMONT PRESSED HEADS

Claymont is now producing more pressed flanged and dished heads than ever before!

That's because we've recently expanded our facilities, installing the most modern equipment available . . . equipment such as this big 3000-ton "push-through" press—one of the largest of its type in existence.

But this efficient giant is just one element in Claymont's extensive head-producing facilities. Large heads—up to 19 feet in diameter—produced on Claymont's spinning machines are world-renowned for their high quality.

Claymont can now fill your head requirements more speedily than ever. And you can be sure that Claymont Pressed and Spun Heads will meet your most exacting specifications. For further details, write Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, Box 1951, Wilmington, Delaware.

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CF&I

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Inverted, Republic Stacking Racks permit long lengths of tubing to overhang without dragging on floor. They also serve as work tables during fabricating.

PR-15 Racks are easily stacked to practical heights regardless of the bulky material they contain.

Mounted in normal position on steel dollies, racks provide ease of movement of tubing from one operation to another.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

How Republic stacking racks help solve a "Hang-over" problem

Franklin Products Company, Franklin, Michigan, manufactures automotive and aircraft fuel and hydraulic lines in varied lengths up to ten feet. Republic Stacking Racks, used in their normal position mounted on steel dollies for mobility, are ideally suited for handling coils and shorter lengths of tubing. However, the longer lengths, bent at sharp angles, present a problem. The tubing frequently has too much overhang for the racks in their normal position and as a result the tubing drags on the shop floor.

To solve this "hangover" problem, Franklin Products have simply inverted the racks on the dollies. The height gained provides plenty of room for overhang and prevents the tubing from dragging on the floor. This double usage of Republic Stacking Racks speeds both handling and fabricating. It has resulted in several other advantages. In the inverted position, the racks serve as work tables during the various tube fabricating operations and at a comfortable operator height. They are also used for transporting tubing from one operation to another.

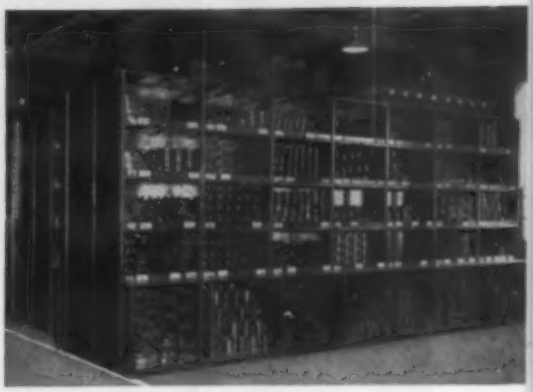
In conventional use, Republic PR-15 Stacking Racks are especially adaptable to packaged materials that do not require the use of sides. Construction features permit easy entry by fork or platform truck. Sides and bottom corners are designed to permit stacking of racks to any practical height either loaded or unloaded.

Give you an idea for your shop or plant? Then contact your Republic Materials Handling Equipment Dealer. He has all the facts on PR-15 Stacking Racks or on the many other types of materials handling equipment made by Republic's Pressed Steel Division. Or write us for more information.

STEEL

and Steel Products

Here are More Problem-Solvers from Republic



WEDGE-LOCK STEEL SHELVING made by Republic's Berger Division provides maximum loading in minimum floor space. It's designed for high stacking of heavy items with no sagging, swaying or buckling. Joints actually get tighter as weight increases. Wedge-Lock Steel Shelving is completely flexible. It can be assembled quickly and easily. Write for literature and full information.

CHAIN SLINGS, ATTACHMENTS AND ACCESSORIES are supplied by Republic's Chain Division in Alloy Steel, High Test Steel and Wrought Iron. They provide an exceptionally high degree of safety in numerous handling operations. All Republic Chain Slings are proof tested and warranted to meet or exceed specifications. They are made in any length to meet your requirements. Write for new catalog.

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☐ Wedge-Lock Steel Shelving

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Efficiency of New Sun Rust-Preventive Grease is shown by accelerated test. Rusted test plate (left) was coated with ordinary grease. The large amount of rust was formed during a 48 hour immersion in synthetic sea water. Plate (right) protected by new Sun rust-preventive grease is wholly rust free after 48 hours.

NEW GREASES PREVENT HARMFUL RUST

Sun rust-preventive greases give improved lubrication ...protect against wet or humid operating conditions

In 48 Hour Synthetic Sea Water Test, rust from plate coated with ordinary grease has turned water yellow (left). Water remains crystal clear in beaker with plate protected by new Sun rust-preventive grease (right).

Water contamination in grease-lubricated parts reduces lubricant life, promotes corrosive wear, and may lead to failure of bearing surfaces.

Sun Oil's new rust-preventive greases are specially fortified to overcome this problem. They give extra protection against both direct water contamination and indirect water contamination caused by high humidity and condensation during overnight and week-end shut downs.

Available at the price of ordinary greases, new Sun rust-preventive greases come in many different grades. For complete information, see your Sun representative, or write for Sun Technical Bulletin 38. Address SUN OIL COMPANY, Philadelphia 3, Pa., Dept. GI-1.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

PHILADELPHIA 3, PA.

IN CANADA: SUN OIL COMPANY, LTD., TORONTO & MONTREAL

SUNOCO

PLEASE TURN TO NEXT PAGE

New buttery grease now protects against rust under highly adverse moisture conditions.

New tacky grease prevents throw-off...reduces consumption. Highly resistant to water.

New high-temperature grease for anti-friction bearings. Exceptional stability, longer life.

NEW SUN RUST-PREVENTIVE GREASES SAVE YOU MONEY IN 3 WAYS

- **Prevent wear... and rust... on 90% of all grease jobs**
- **Serve as low-cost rust preventives for storing shop equipment**
- **Save storing and handling special-purpose greases**

Sun Oil Company's new greases are fortified to protect against rust. Lubricity is improved and wear is reduced because grease-lubricated parts are now protected at all times against rust and corrosion caused by condensation and process water.

The effective life of these new rust-preventive greases is approximately twice that of conventional greases operating under wet conditions. And, their extra protection against moisture permits their use as a rust-proofing medium for shop storage of tools and parts.

Competitively priced with ordinary greases, these new greases can be applied by any conventional method...brush, swab, pressure gun, or through central pressure systems.

Because of their improved quality, these new Sun greases will now perform 90% of all grease lubrication jobs. You reduce grease inventories ...lessen the risk of using the wrong grease... simplify your handling problems.

For complete information, see your Sun representative or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. GI-2.

SUNOCO

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No *one* man could have written this book. It required the combined skills of 31 of the nation's foremost experts. . . men like Charles L. McGranahan on hot and cold-rolled strips and sheets; Waldemar Naujoks on forgings; Alfred E. Kadell on tin plate, and 28 others of equal stature.

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Capital Airlines recently added the first of 60 Vickers Viscounts to their fleet . . . powered by the Rolls-Royce "Dart" engine, a new "turbo-prop" design. These engines assure an almost noiseless, vibrationless flight.

New engines that murmur instead of roar

All you hear in flight is a subdued "whoosh" . . . the pleasant, hushed voice of Capital's fabulous new "turbo-props."

And reduced, along with the old-fashioned engine roar, is vibration. Everything's so calm, you can even balance a quarter on edge . . . at 335 m.p.h.

That's the kind of ride to expect when you travel on speedy new Capital Viscount planes. Their Rolls-Royce "turbo-prop" engines make possible this extra quiet, extra fast, extra smooth travel experience.

How does this new "turbo-prop" engine work? Something like a military turbojet. Except that the "turbo-prop" uses most of the hot gases' energy to spin a propeller. In a jet, the gases stream out the tail to create thrust.

In designing this engine, one big problem had to be licked . . . the intense, internal heat. Gases burn at well over 1600°F. in the combustion chambers. That's hot enough to burn away some metals . . . and sap the strength of most. What metal could take it? For the combustion chamber liners? For the spinning turbine blades . . . that become white-hot under the unremitting blast of hot gases?

Happily, International Nickel had the ready answer to both problems. Nimonic "75"*. . . because of its great resistance to oxidation and high temperature corrosion . . . is giving excellent service lining combustion chambers. Turbine blades are of tremendously strong and heat-resisting Nimonic "80A"*.

Credit for much of the engine's high performance and reliability comes from its use of nickel alloys in flame tubes, turbine blades, cones and nozzles. Nickel-bearing steel alloys keep other vital parts on the job. In fact, six percent of the engine's total weight is nickel.

Are you searching for a metal that will stand up at high temperatures? Resist corrosion? Withstand wear? Provide some unusual electrical property? Then write for our handy guide to more than 20 alloys developed specifically to give longer, better service under these conditions. Write us at 67 Wall Street, New York 5. *Trademark

INCO TRADE MARK

INTERNATIONAL NICKEL

Nickel Alloys Perform Better, Longer

Metalworking Outlook

More Steel Expansions

As 1956 gets started, eight more steel companies outline new expansion, or give details about previously announced plans: U. S. Steel will add 2.5 million tons of ingot capacity at Chicago, in Utah and other plants; Inland has just boosted its pig iron capacity from 2,638,950 tons to 3,011,200 tons annually; Colorado Fuel & Iron is expanding steelmaking capacity by 15 per cent at Pueblo, Colo.; Wheeling plans to increase its ingot capacity from 2,130,000 to 2.4 million tons annually within the next two years; Sharon will boost its annual ingot capacity, now 1.5 million tons a year, by more than 300,000 tons by the end of 1956; Detroit has rebuilt its No. 1 blast furnace at Portsmouth, O., so that it can boast having a potential of 264,000 tons of pig iron annually; Detroit will spend an additional $7 million on improvements in 1956 which will boost its ingot capacity 12 per cent to 1,450,000 tons; by mid-1956, Alan Wood will have boosted its ingot capacity from 625,000 to 800,000 tons; it has additional projects under study, including more blast furnace potential; Eastern Stainless will hike stainless sheet production by 50 per cent with installation of a Sendzimir reversing cold process mill.

Titanium Prospects Brighten

Look for about 2800 tons of titanium mill products to be delivered in 1956. That compares to some 2000 tons delivered in 1955 and 1200 tons in 1954. The expansion will come because titanium producers have improved their quality and because delays in airframe and engine production programs now appear to be resolved.

Coal Comes Back

Expect soft coal production of 580 million tons by 1960 and 780 million tons by 1970. So predicts Joy Mfg. Co., which sees output climbing about 20 per cent between 1950 and 1960 and 50 per cent between 1950 and 1970.

Steady Growth in Cans

Within the next four or five years, can production should be well over 40 billion units annually. American Can Co.'s William C. Stolk forecasts output just under that level for 1956, compared with 38 billion units in 1955 and 36.2 billion in 1954.

Shipyards Busier

Shipbuilders think they will make a bigger splash in 1956. Jobs under way include 4 passenger ships, 7 tankers, 11 merchant-type naval auxiliaries, plus 4 experimental conversions of Liberty vessels in which new types of propulsion units will be installed. Seven merchant ships were delivered in the last six months. The 26 jobs under construction repre-

Technical Outlook—p. 57 Market Outlook—p. 89

sent work worth $233 million. In the next six months that total may climb to $500 million.

Dip in Scientific Items

Scientific apparatus makers are plugging hard to lessen a probable 5 to 10 per cent decrease in their 1956 shipments. In 1955, their volume jumped 5 to 15 per cent, compared with 1954's, points out the Scientific Apparatus Makers Association. It sees a downturn in the industry's sales during the second half, but the dollar drop may be offset to some extent by price increases. SAMA says only 2845 industrial companies have laboratories.

Research To Hit $4.5 Billion

Industrial and scientific research in the U.S. should hit a new high this year—$4.5 billion, compared with $4.1 billion in 1955 and $3.75 billion in 1954. Battelle Memorial Institute's president and director, Clyde Williams, points out that research has averaged about 1 per cent of the gross national production for the last five years. In 1956, research should be about 1.12 per cent of GNP. Research in industry averages 2 per cent of gross sales. But outlays in aircraft, plastics, electronics and pharmaceutical industries range from 4 to 10 per cent of the sales dollar.

The Profit Picture

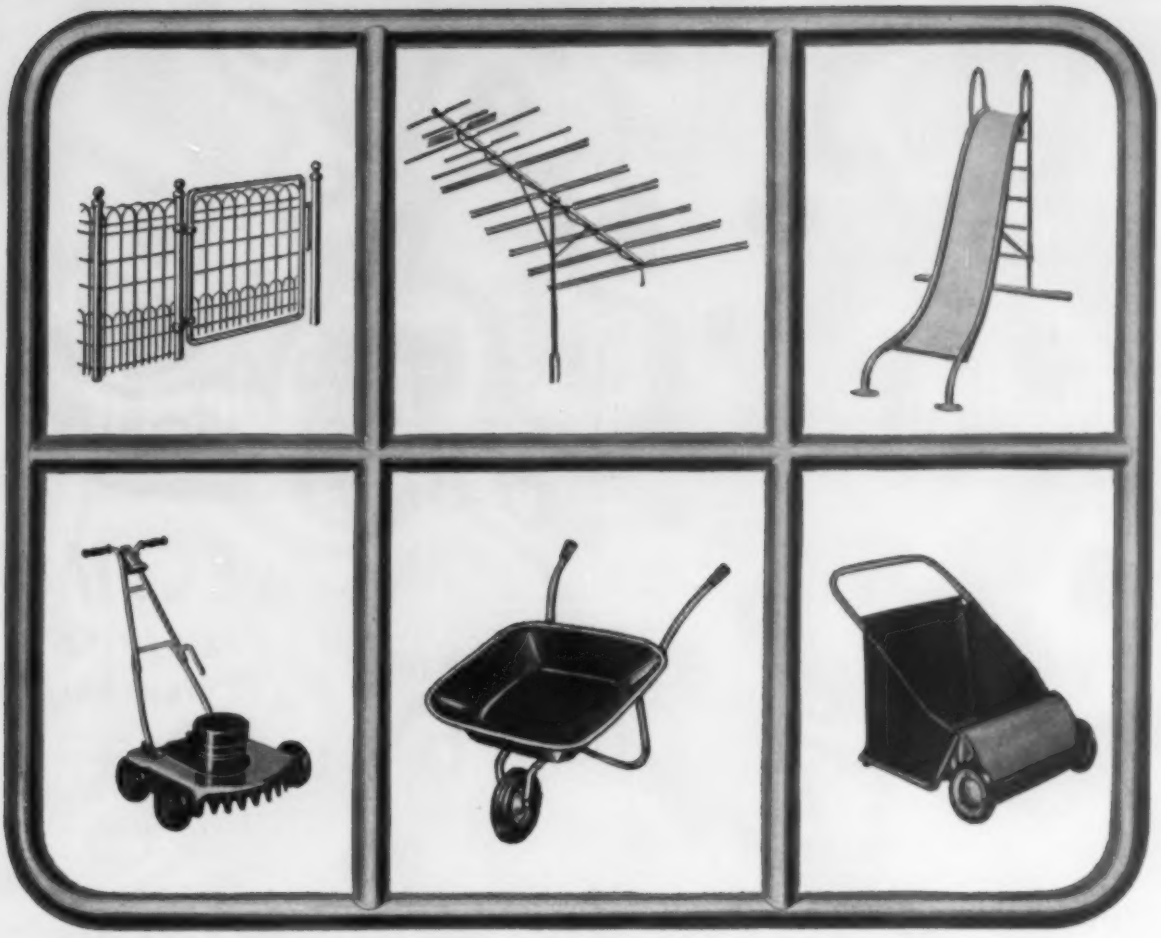
Metalworking profits in 1956 should be about the same as in 1955—excellent. A survey of 490 firms shows that earnings in the first nine months of last year jumped 33 per cent over the same period of 1954. The prospects for 1955 are for an all-time high. Here are samples of percentage gains in the 1955 period over the same 1954 months: Major steel companies, 78; iron and steel fabricators, 65; light machinery and metal parts, 65; nonferrous metals, 40; automobiles and trucks, 65; automotive parts and equipment, 78; home appliances and machinery, 71; office equipment, 17.

Freight Rates May Rise

Railroad freight rates will go up 7 per cent on Feb. 25 unless the Interstate Commerce Commission says "no." In an unusual move, the ICC waived some of its customary rules and will permit railroads to prepare their new tariffs now so that they can become effective immediately if ICC O.K.'s the increase.

Straws in the Wind

The Air Force will order more heavy presses of the extrusion variety sometime in 1956 . . . The Air Force has let contracts totaling $35.5 million for long-lead-time machine tools . . . Fast write-off permission is discontinued for commercial planes, freight cars and electric equipment; look for it to end for production of manganese ore and rutile . . . First ground tests on an atomic airplane engine designed and built by General Electric Co. have been run; other companies with development contracts in the atomic aircraft propulsion field include Boeing Airplane Co., General Dynamics Corp., Pratt & Whitney Aircraft Division of United Aircraft Corp. and Curtiss-Wright Corp.



Special Zinc-Coated ARMCO TUBING

May Improve Your Products, Too

A new kind of material is now going into the products you see here.

It is Armco ZINCGRIP Tubing. Besides being modern looking, it gives these products the unbroken rust protection of a hot-dip zinc coating, along with the strength of welded tubing.

This welded tubing is made of Armco ZINCGRIP, a special steel coated on both sides with zinc by a patented process. Even the welding flash is planed away on the outside, and a new zinc coating applied to form an almost invisible seam.

What's more, the special coating stays on when Armco ZINCGRIP Tubing is bent or twisted into shape by the manufacturer. There are no zinc-bare spots where rust can get a quick start.

Armco ZINCGRIP Tubing is made in outside diameters of ⅜-inch through 3 inches, with wall thicknesses of 20 gage through 12 gage. For information and prices, just fill out the coupon and mail it to us.

Armco Steel Corporation, 1615 Curtis St., Middletown, Ohio
We manufacture_____
Send me information on Armco ZINCGRIP Tubing ☐
Quote me on:
_____ feet_____ gage_____ diameter _____length

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ARMCO STEEL CORPORATION 1615 CURTIS ST., MIDDLETOWN, OHIO

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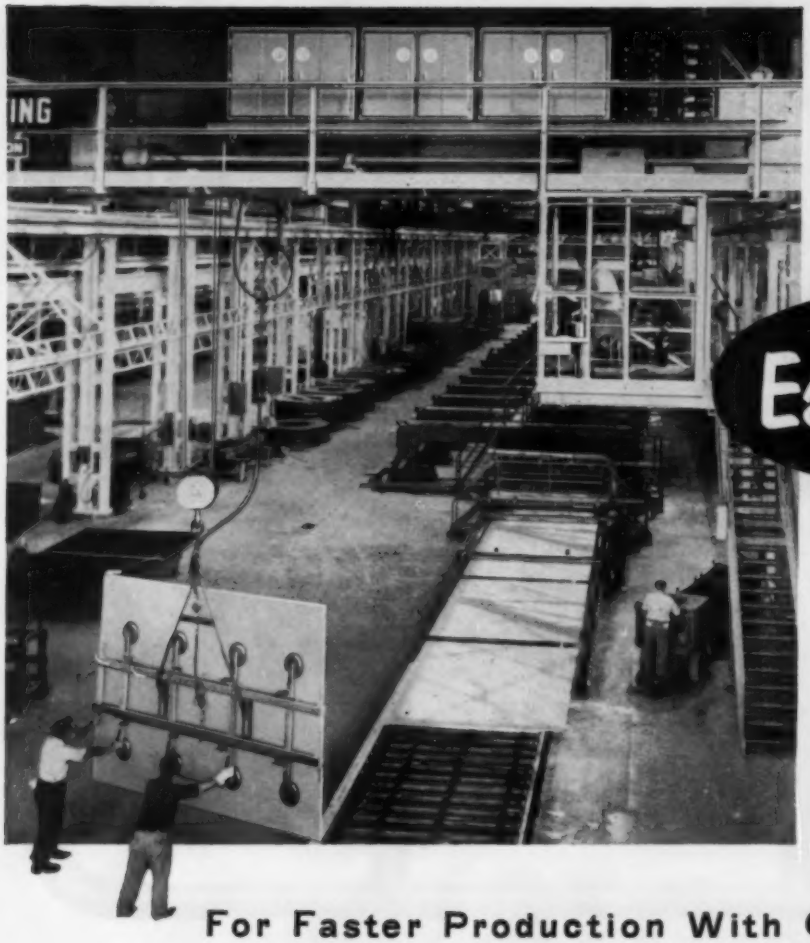

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with EC&M *ENGINEERED* CRANE CONTROL

One of several EC&M Controlled cranes which serve the grinding and polishing lines in a glass manufacturing plant. EC&M Control permits slow even speeds . . . as workmen walk along and guide the load . . . as glass is gently lowered onto the work tables.

For Faster Production With Greater Safety

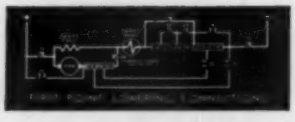
Your crane control is developed by EC&M from the crane data sheet. From gearing, rope reeving, motor loading and similar data, EC&M coordinates the control components to give the desired speed regulation that results in smooth performance . . . right from the start.

Before buying your next crane, call the nearest EC&M office and ask for a demonstration. They'll be glad to provide you with an opportunity to climb aboard and operate an EC&M controlled crane. Remember . . . EC&M control equipment assures precise performance for both old and new cranes . . . and performance is proof.

THE ELECTRIC CONTROLLER & MFG. CO.

4498 Lee Road • Cleveland 28, Ohio

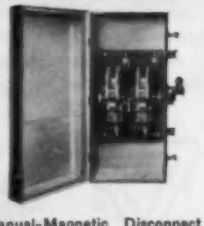
Quick-responding Crane Controller with LINE-ARC Contactors and TIME-CURRENT Acceleration



EC&M simplified Wright Circuit provides safe hoist operation

Youngstown Safety Limit Stop eliminates over-hoisting accidents

"WB" Brake provides long life and high speed operation



Manual-Magnetic Disconnect Switch has high interrupting capacity . . . provides remote control

Team Pay for Teamwork

My neighbor, Bill Telle, has a beef. Bill is chief design engineer for a machinery company. He creates special equipment to solve special problems for his company's customers. He is in on the job from the time the problem is outlined until the machine is functioning in the customer's plant.

His beef is a common one: Compensation. Bill is on straight salary. It is adequate. But his earnings are substantially less than those of the salesmen credited with selling his creations. Bill doesn't think that is fair.

"Actually, I do as much selling as the salesmen. Sure, they are the boys who cultivate the area. But when the customer is ready to talk over his production problems, they call for me and my boys. We have to supply the know-how. We have to design and oversee the construction of the machine or system. In our company, we follow it right down to the customer's floor.

"Now, tell me, why shouldn't I get a commission on the sale just like the salesmen?"

We think Bill has a good point. So much machinery and equipment is being engineered for a particular production problem that some of the designers and engineers, perhaps even some production men and demonstrators, are as much of the sales team as the salesmen. Selling capital goods is becoming more of a team task, just as is management.

Advanced mechanization, or Detroit automation, requires machines that can be integrated. Often, the equipment maker is selling an entire production line. He is making and selling a way of production. The principal ingredient is know-how. Engineering may exceed other labor and material costs.

The product is designed and produced to be sold. Automatically, that seems to create a sales team.

If we recognize the principle of team selling, then we must consider the next step: Team compensation.

Perhaps here we will find a correction for the unrest among engineers and others who often operate behind the front line of sales.

Perhaps here is suggested a way of establishing a true incentive for technical personnel and one that will take sales consciousness into the backrooms.

Certainly, the team concept follows the trend toward more scientific selling and enables the manufacturer to offer a service package.

Walter J. Campbell

MANAGING EDITOR

Now! Vastly Improved Quenching with Salt!

ANY steel that can be hardened by oil quenching can now be martempered or austempered in the new Ajax Cataract Quench Salt Bath Furnace . . .

. . . with equal hardness and with all of the PLUS heat treating advantages that only molten salt can give.

This new Ajax Electric Salt Bath Furnace with its vastly increased cooling rate permits rapid quenching of steel parts through their critical temperature range.

Tremendous quenching power is obtained by an adjustable-speed pump. The downward flow of salt into the quenching header can be regulated for various hardenabilities.

Send specimen work to the Ajax Metallurgical Service Laboratory for a process demonstration—preferably in your presence . . . No obligation.

AJAX CATARACT QUENCH FURNACE

Provides greater quenching power than previously possible.

Permits heavy sections to be martempered and austempered. (Sections up to 6" diameter, can be martempered and sections up to 1¼" diameter austempered).

Assures high and uniform hardness.

Eliminates excessive distortion — As a rule, parts can be finish-machined *before* hardening.

Avoids danger of quench cracking.

Increases toughness and ductility.

Write for Bulletin 700

"Ajax Cataract Quench Furnaces," **and Technical Bulletin 500,** ***"The Present Status of Austempering and Martempering."***

AJAX HULTGREN

Associated Companies: Ajax Electric Furnace Corp.; Ajax Electrothermic Corp.; Ajax Engineering Corp.

electric SALT BATH furnaces

AJAX ELECTRIC COMPANY, 952 Frankford Ave., Philadelphia 23, Pa.

Seven Steps to a Good Sales Pay Plan

Know Your Sales Force . . . Carefully evaluate both the salesmen and the territories. Know as much as you can about performance and potential

Know Industry Practice . . . Keep informed on salesmen's earnings throughout the industry. Yours must be competitive

Be Consistent . . . Establish a pay policy and plan that will apply to all men and to all territories. Avoid individual agreements, except those that fall within the scope of the plan

Look Ahead . . . Set up a plan that anticipates unusual circumstances, that allows for both good times and bad. Avoid the problem of changing policy with the times

Consider Economics . . . Figure remuneration as an equitable balance between earnings for the man and sales costs for the company

Explain the Plan . . . Put an explanation of the sales pay policy in writing. Be sure each man knows and understands how the plan works and how it will apply to him

Keep in the Driver's Seat . . . Use a plan that leaves control of sales activities with management

In capital goods, the plan must be tailored to give . . .

Fair Pay for Salesmen

"LATE IN THE '40s, one of our good salesmen had a year in which he made just under $7000, and we felt sorry for him. This year his earnings will push $50,000—and he ought to feel sorry for us."

The sales manager who cites that case admits his company's system for paying salesmen is at fault: His job now is to set it right.

And More — Paying fairly in boom or bust is just part of his problem. He also wants a plan for unequal territories which will not penalize the man in the poor district.

Above all, his plan must provide earnings that are competitive. He'll have to find out what similar companies are paying. Otherwise, he may not be able to get and hold the caliber of man he wants.

At the same time he must be sure the plan doesn't overpay. High sales wages are high sales costs.

Universal — Almost every sales executive in the capital goods industry pegs the riddle of "how to pay?" near the top of his list of problems. Many admit they can't be sure the system they're using is the best for them. Only a handful feel they have the best solution.

What is being done? For one thing, almost everyone is continually searching for new plans to check out, for new answers to old problems.

They find that while they can use other plans for ideas, they always wind up with a plan that's tailored to the needs of their company.

Variables like product, over-all company pay policy, the market, territory makeup and the sales force itself will make the problem and answer unique to every company.

Management Job—The first step in getting the right plan lies in knowing what's required. The accuracy of two management evaluations directly affects the success of any plan.

First, know the salesmen well and know what they're worth to the company.

Second, C. M. Smalheer, with Robert Heller & Associates, Cleveland, feels a good market analysis by territory is fundamental. You

can't know how a man is doing until you know what his area offers. Such studies even offer the ideal solution to the unequal territory puzzle. Theoretically, but seldom practically, the potential of all territories can be equalized.

Musts—While there is disagreement among sales executives on all details, there is almost universal accord on basic requirements.

The plan must be formal and mechanical. An explanation of the system should be down in black and white. Salesmen should understand the plan and believe in it.

In capital goods, almost all plans provide the salesmen with some security. Further, the plan must put the company management squarely in the driver's seat when it comes to control of sales activities.

Types—Pay plans fall into one of three broad classifications: Straight commission, straight salary and salary, plus commission. All have points for and against them.

Straight Commission—The closer a man's earnings are tied to his efforts, the harder he'll work. Straight commission plans offer the greatest possible incentive. Despite this, they're inept for capital goods because of the last two musts listed above: Security and management control.

In bad years, the salesman whose earnings are pegged wholly to orders finds his income can fall below even a subsistence level. D. M. Pattison, vice president, Motch & Merryweather Machinery Co., Cleveland, points out good men can be forced to look for greener pastures. In boom years, earnings can be exorbitant.

On straight commission, the salesman tends to think of himself as a private businessman. He cultivates clients that promise the biggest immediate sales. He may ignore the equally important group of smaller customers since they require more effort per dollar sold. He also is understandably inflexible, will hesitate to move to new customers if it means giving up some big ones.

Straight Salary—Substituting security for incentive, this type lets the salesman forget earnings, go to work on selling. It offers maximum control to management, since no matter what job the man is assigned to, his earnings are guaranteed as long as he performs well. But it offers no incentive, and doesn't adjust earnings to the times.

Straight salary is best where sales are big and where they may be infrequent. For example, the salesman whose orders are expressed in more than six figures, may sell one installation this year and five next. An attempt to make a commission apply to both years, and to be fair to both the man and the company, is likely to fail in both respects.

Salary, Plus—This area is by far the broadest, most widely used and, many experts say, most promising. These plans offer salary for security (and control) plus a commission for incentive and a share in prosperity. F. Steel Blackall III, vice president, Taft-Peirce Mfg. Co., Woonsocket, R. I., also thinks they offer the best practical opportunities for sales expansion.

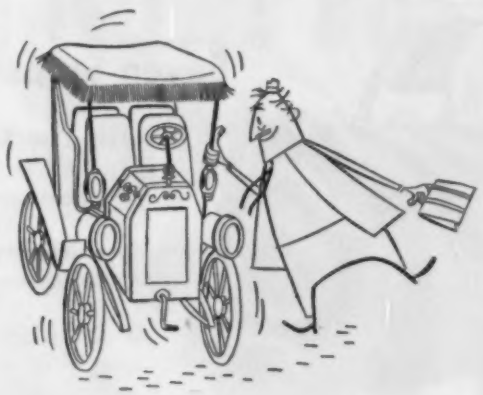
Salary is usually pegged at what management thinks will cover the proper cost of living of the man. There's no rule or formula for it. Management "feel" is important. So is a genuine desire to be fair.

One standard, not universally agreed on, is that salary should cover between one-half and two-thirds of the man's total earnings in a good year. Many seem to be set between $400 and $800 a month.

Balance—Another important advantage of the "plus" portion of these plans (also an advantage of straight commission): They keep a balance between the man's earnings and company costs. In a good year the man gets a share of prosperity. In a bad year, the plans automatically cut sales costs. They avert the always embarrassing task of cutting pay and the equally-unfortunate alternative of paying out of proportion to company income.

"Plus" Plans—There are as many ways to add to the salary as there are companies to try them. Generally, however, there are three groups: Individual commission, district-office commission, and company-wide incentive.

Individual commissions give the best incentive. They are a direct



The Case for Fringes

FRINGE BENEFITS are an important part of a salesman's earnings but are seldom sold as such by management.

Executives of a Chicago equipment builder feel

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these fringes receive too little recognition since they aren't part of a salary or bonus check. Nevertheless, as an essential cost of doing his job, they represent real dollars to the salesman.

Here's how they estimate the value of fringes to their salesmen:

Leased car, including depreciation, insurance, license, taxes, maintenance, which otherwise would be borne by the salesman	$70 a month*
Other benefits, including the expense account, company-paid insurance, hospitalization, retirement annuity	$45 a month
	$115 a month

*Would be about the same on a per-mile basis

reward to the man for his success. They make the best salesmen happiest. But, they don't encourage teamwork.

District Commissions — These are paid on total sales within a territory, are divided among the men in that district. While each man's share is affected by the performance of all, he still will feel directly involved in the size of the payoff.

Executives at Barber-Colman Co., Rockford, Ill., also point out this type plan promotes a "team office." One man will help another in his district. The team tends to straighten out the laggard.

In addition, management can reassign territories within a district without protest, since the switch is designed to boost total district sales.

Company-Wide—This type includes bonuses, sales pools and over-all commissions. The plans often are used to level out earnings of all territories. If Detroit is booming and Atlanta is down, a portion of Detroit's earnings goes to Atlanta.

Outlook on a plan like this depends on where you sit. Magnanimous as they may be, Detroit men aren't going to be overjoyed at being called on to support others. Top management may find the plan an easy way to reward the Atlanta man for a good job in a territory that happens to have a lower sales potential. The Atlanta man is, of course, delighted.

Combinations—These constitute the outlines for most plans in use. Combinations of the basic plans often prove best. One company, for example, pays each salesman a salary of about $600 a month. On top of this he gets an individual commission, a portion of which is assigned to a sales pool. The pool is distributed equally to all salesmen.

It's common practice also to pay straight salary, but to top it off with a year-end bonus. Cross Co., Detroit, does it this way: A contribution to the pool is made by the company. It's based on sales.

Room for Change—An essential part of any plan is its provision for flexibility. Differences in ability and seniority must be recognized. Differences in territories require some maneuverability.

The least-complicated way to permit flexibility is to alter salary. Equally successful plans allow for different commission rates. While one man gets 1 per cent on his earnings, another may get 1½. A third way to alter earnings is to vary participation in the district or company pool.

Review—Flexibility is necessary to provide for the man's growth. As he gains experience and know-how, he becomes more valuable.

It's essential that he knows his earnings records aren't gathering dust in the home office. A regular review of his status should be guaranteed. He must know the review will take place without asking for it.

The whole area of communications is critical to the success of any plan. Sundstrand Machine Tool Co., Rockford, Ill., has published a bulletin that explains its complete sales pay plan. To be circulated among the sales force, it will tell the salesman how his earnings will be figured.

Future—As the nature of capital goods selling changes, it's a good bet pay plans will change to keep pace. One innovation that bids fair to be in the fomulas of new plans: A share of commissions for some of the engineers.

While it's true that a few companies include engineers in the sales pay plan, the number is still too small. Only two of the more than 15 companies contacted by STEEL provided for them.

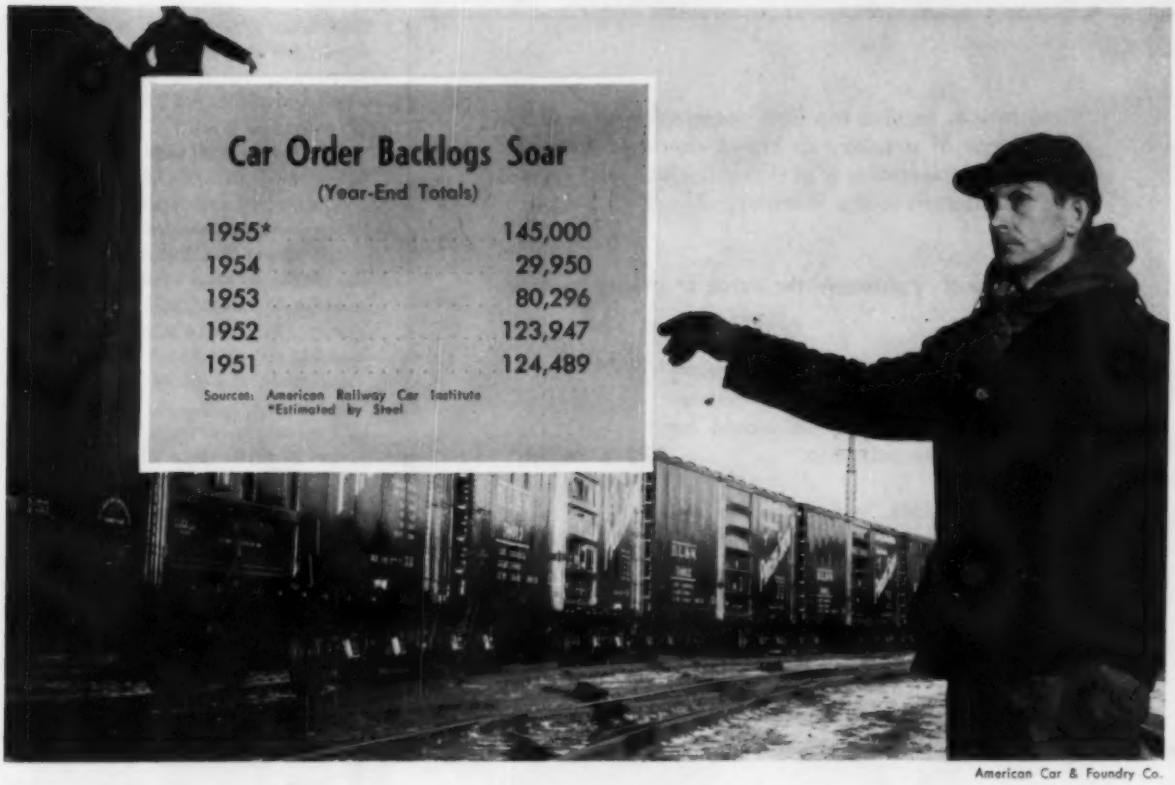
In an industry where much of the product is sold on engineering features, the engineers who figure directly in the sale are part of the team. They seem bound to share in any future group plans.

Strikes: Adding Up the Cost

Strikes caused 28 million man-days of lost production in 1955, up almost 24 per cent from 1954. But, notes the Bureau of Labor Statistics, the figure is still lower than in all but two postwar years, 1954 and 1951.

Much of the increase is put down to the scattering of brief strikes in steel and auto industries during last summer's contract negotiations. There were 26 strikes involving 10,000 or more workers, compared with 18 in 1954.

The transportation equipment industry was hit by the biggest number of major strikes, with four for the year.



American Car & Foundry Co.

Steel famine and order surplus point up . . .

Carbuilders' Dilemma

FREIGHT car builders enter the new year with a whale of an order book.

Much of this business was heaped upon them in the final two months of last year, when the railroads, in an effort to beat the year-end deadline on quick write-offs for new equipment, placed more than 87,500 cars. Builders' backlogs jumped to an estimated 145,000 cars, for one of the heaviest totals in the history of the industry.

Seamy Side—Unfortunately, all is not well. The load comes at a time when steel is as scarce as hens' teeth. Of the estimated total of 162,000 domestic freight cars placed last year, all but 15,000 or so were awarded during a period, beginning last June, when steel was almost as scarce as it is now. It is doubtful if the output of freight cars for all of 1955 exceeded 38,000.

In coming months carbuilders will get more steel. But they will still be in for a bad time. Their supply for some months will be small in relation to their needs. Some believe they will be lucky if they can cut substantially into their backlogs before late this year.

Dilemma—Discussing the plight of carbuilders, Lester N. Selig, president, American Railway Car Institute, says: "When we could have obtained ample steel, we had virtually no orders; now we have orders, but cannot get the steel."

Railroads explain their delay in getting into the market by pointing out that in 1954 there was a heavy surplus of freight cars and that it was not economically possible for them to maintain equipment up to the usual standard, or to make commitments for the purchase of new equipment comparable with normal years But they admit it was unfortunate that they felt they couldn't act sooner. They not only are shy on rolling stock they so badly need but also are paying more for what they buy.

In Demand—A resurgence of interest in passenger cars is noted, particularly in the new lightweight trains. However, it appears that awards for last year will be slightly below 1954—around 600, compared with 620.

While specific equipment needs are relatively light, interest in "piggybacking" is growing. According to the *Railway Age,* 34 railroads are piggybacking, with 11 beginning operations last year. More than 3000 flatcars and 3500 trailers are in use. At least 1000 additional flatcars are either on order or will be converted from existing equipment.

With the year-end deadline on quick write-offs now past, a tapering in new freight car orders appears likely, and especially with the steel supply situation still so critical. However, Mr. Selig believes that "the carbuilders can expect railroad necessity and national prosperity to keep their volume at a generally high level for at least several years ahead."

Progress in Cutting Tools

"TOOLMAKERS today would scrap the same carbides they welcomed ten years ago." That report from James E. Gray, sales manager, Firth-Loach Metals Inc., McKeesport, Pa., shows how far carbide cutting tool compositions have advanced since World War II.

The new cutting tool substances of the last ten years don't supplant earlier materials. Carbides and ceramics will give users greater variety without putting earlier materials out of business.

Early Start—First developments in production of high-speed steel for cutting tools began in the late 19th century. Tests led to selection of a tungsten and chromium-bearing steel which increased cutting speeds of lathe tools by 200 per cent, say industry records.

During and since World War II, tool and die makers learned how to use carbides. As a result, there's an immense increase in peacetime requirements. Producers say carbide tools last up to 50 times as long as steel tools and enable machines to operate as much as ten times as fast. This type performance boosted demand for carbides in 1955 to a reported 300 per cent of 1945 demand.

More To Come—The future of carbides is equally exciting. Report officials of Carboloy Department, General Electric Co., Detroit: "Developments which will increase use of carbides include more use of titanium and zirconium in atomic energy applications, trends to use of higher tensile strength steels and to precision forging and casting which will require carbides designed for higher speeds and lighter cuts."

Industries which are using carbide cutting tools and are expected to use more include woodworking, plastics, aircraft and agricultural machinery. Among the largest fields is automaking. In the mining industry, carbides are making automatic mining of coal possible. More carbides are being used in the extrusion of metals.

Throwaways—A quickly growing use of carbides is in mechanical holders. "Throwaway bits" save the cost of grinding. A triangular bit affords six cutting edges.

"We're constantly developing new carbide compositions." In the highly competitive world of carbide research, this comment is routine. Armed with imagination, producers plan to expand to limits of metalworking's needs—but not at the expense of quality. In all stages of production, carbides are protected from contamination and given rigid tests.

Research—In 1955, some research in use of tungsten carbides was held back by a reported shortage of the metal. Says Philip M. McKenna, president, Kennametal Inc., Latrobe, Pa.: "There's no shortage. Most available tungsten is going into stockpile."

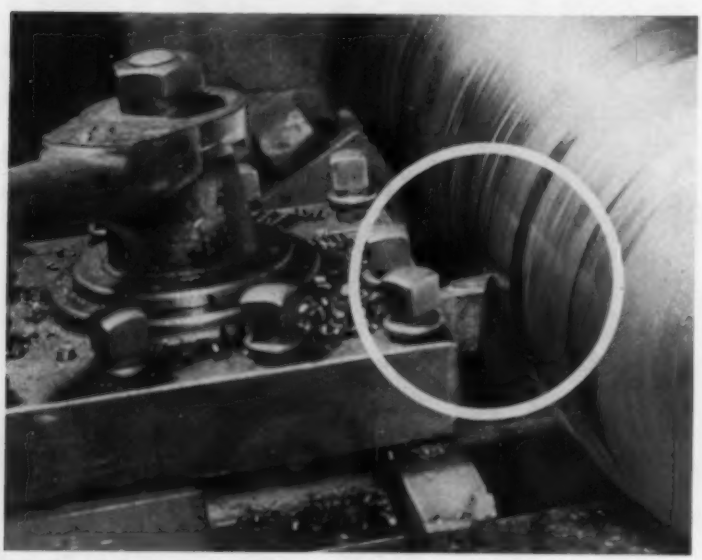
Cost attractiveness of carbides is constantly being stepped up. Grinding carbide tools once was a headache. Diamond wheels were found to be one answer. Alternative grinding methods are coming into vogue, like the electrospark process being introduced by Firth Sterling Inc., Pittsburgh.

Ceramics' Value — Cutting tool makers are taking a second look at ceramic material. They say it will supplement, but not replace, carbide compositions. It's a brittle, less metallic material then cemented carbides. It generally has an aluminum-oxide base.

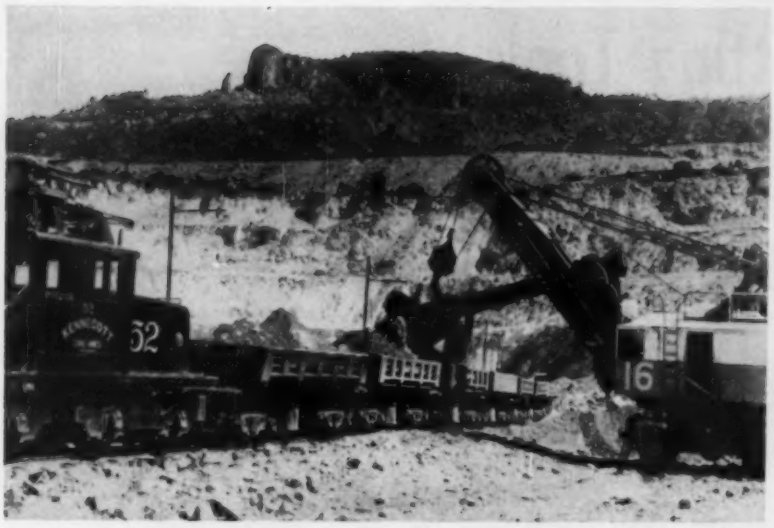
Holding back ceramics is their newness. Tensile strength at low temperature, ductility and thermal shock resistance are reportedly inferior to those properties of carbide and high-speed steel tools.

Fast Work — Ceramics' advantages are many — hardness, strength at high temperatures and use of nonstrategic materials. Ceramic tools can machine at high speeds (up to 2000 surface feet per minute, says one producer). In some applications, ceramics give tool life of more than 25 to 1 over carbides — because of excellent wear resistance.

Stupakoff Division of Carborundum Co., Latrobe, Pa., has announced the beginning of commercial shipments of its new oxide-base cutting tool material. Carboloy and Norton Co., Worcester, Mass., have ceramic tools available to users on a limited basis. New ceramic cutting tools are available from U. S. Ceramic Tile Co., Canton, O. At least one carbide producer is thinking of entering ceramic production. With this aggressive approach, researchers guarantee bright prospects for metal cutting in 1956.



Grade 350 Carboloy cemented carbide takes a big bite from a large motor shaft. Work is on a 40-hp lathe. Maximum cut depth is ⅛-in.



Copper Expansion Coming

Copper men have mapped out a plan to raise world capacity to 7,835,667 tons by 1958. The red metal may come off the critical list by June

THERE will be enough copper capacity to meet demand during the coming year (see table). The unanswerable question is: What will labor do to help bring production anywhere near new capacity figures?

Who's Who—The U.S. continues to be the world's largest producer. Of total world production during 1954, the U.S. produced 45 per cent; Africa, 27 per cent; Central and South America, 16 per cent; Asia, 6 per cent; Europe, 4.5 per cent; and Australia, 1.5 per cent.

Production during 1955 reached about 2,737,997 tons—a record year. And barring serious strikes or political events which might affect mine production, the next three years could bring new records each year. Refined copper production this year should top 3 million tons.

One thing is apparent: The U.S. needs foreign copper and must attempt to solve not only domestic but also international copper disturbances. This calls for the solution of problems dealing with currency convertibility between countries, government stockpiling, foreign exchange controls, trade agreements, import-export licensing, etc. World communism is also a continuing threat to labor peace in many of the copper mining areas of the world.

Strike Help?—Each increase in production may help solve the strike problem. As increased capacity turns into production, one area strike will not have as much effect on the over-all copper supply picture. Last year's strikes in Africa, Chile and the U.S. lost some 150,000 tons of refined copper.

Substitution — Copper advocates feel that as 1956 brings a better balance between supply and demand, it will help assure users of a continuous supply of the red metal. "It is likely," says the Copper & Brass Research Association, "that a period of freedom from production interruptions and price fluctuations in copper will do much to re-establish user confidence."

1956—Population increase, the expected high level of business in construction, machinery, automobiles and other durable good items

Additional Copper Supplies (net tons)

	U. S.	CANADA	S. & CENTRAL AMERICA	AFRICA	OTHER
1958	235,000	195,550	474,850	516,800	55,070
1957	219,000	147,500	476,850	464,800	45,000
1956	172,000	142,000	478,450	418,700	37,000
1955	87,000	92,100	432,300	379,700	27,500

Source: Copper & Brass Research Association

TOTAL WORLD CAPACITY (net tons)

1958	7,835,667
1957	6,358,397
1956	5,004,747
1955	3,756,597

will stimulate high level demand for copper in '56.

And as the table indicates, the copper industry, in the U.S. and abroad, is engaged in a long-term program to expand capacity and production. New production techniques also are being introduced

Expansion Coming

UNITED STATES—Bagdad, Greater Butte, Greater Butte Extension, White Plain

CANADA—Campbell, Chibougamau, Chibougamau Explorers, Amulet Dufault, Gaspe, Opemiska, Granby, Canam, Hudson Bay

S. & CENTRAL AMERICA—Peru: Cerro de Pasco (San Cristobal); Chile: Chuquicamata, Braden; Cuba: Matahambra

AFRICA—Northern Rhodesia: Nchanga; Belgian Congo: Katanga; Southwest Africa: Lorelei; Union of South Africa: O'Okiep; Tanganyika: Mpanda

OTHER—Australia: Mount Lyell, Peko; Philippines: Atlas; Europe: Austria (two mines), Norway (Orkla)

New Copper Mines

UNITED STATES—San Manuel, Osceola, Pima

CANADA—Heath Steel, Brunswick, Tilt Cove, Gull Pond, Geco, Ontario Pyrites, Granduc

S. & CENTRAL AMERICA—Chile: La Africana, Sagasca; Mexico: Tlapehuala

AFRICA—Northern Rhodesia: Chibuluma, Bancroft, Kansanshi; Uganda: Kilembi; Kenya: Macalder-Nyanza

OTHER—Philippines: Mindanao, Davao; Israel: King Solomon

which will allow lower grade ores to be used.

Crux: Other metals will continue to make inroads, but there will be continuing demand for copper which will absorb all new production for some years to come.

AEC To Buy Atomic Fuel

Babcock & Wilcox Co. is building a plant at Lynchburg, Va., to make atomic reactor fuel elements.

The elements are needed to fire up an atomic furnace for the Atomic Energy Commission's materials testing reactor at Oak Ridge, Tenn.

Assemblies are now made at the Oak Ridge National Laboratory; buying them will free the laboratory for other work.

Fuel elements are made by processing enriched uranium with alloys into plates, rods and other shapes. The shape depends upon the design of the reactor.

Scrap Prices Push Ceiling

Convention speaker tells delegates that price break may be coming. It's too much, he warns, when mills must pay more for scrap than for basic pig iron

HOW high is up?

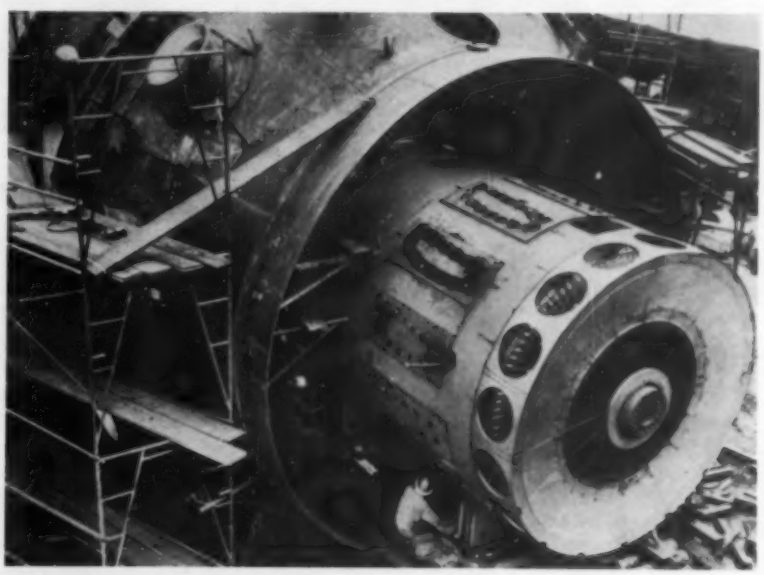
As far as scrap is concerned, the answer could come faster than expected, thinks David C. Holub, president, Institute of Scrap Iron & Steel.

Price Pattern—Scrap is selling at record levels. Within the last ten days, Mahoning valley steel mills paid up to $62 per ton for production scrap—more than the price of basic pig iron, now at $58.50 per ton in many areas. This sharp jump has been followed by a corresponding hike in dealer material. No. 1 quality grades are being quoted at $58 to $60 at some consuming points.

Both dealers and brokers would not be surprised by a severe market break. Mr. Holub told the 28th annual convention of the institute in Chicago last week that any bulge in the price would only serve to attract more scrap onto the market. He noted that this was a normal business risk. However, while the industry's inventories are not large, substantial losses could come if the market should take a sharp turn.

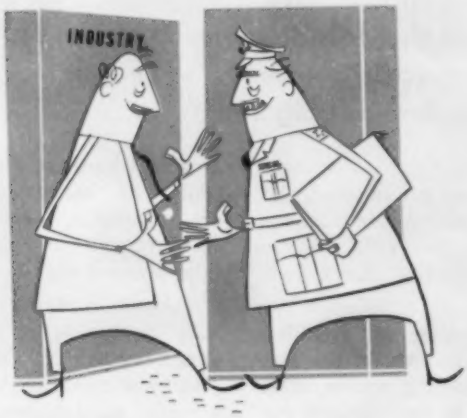
Convention News — Edwin C. Barringer, executive vice president of the institute, told delegates that just as automation was becoming a magic word in metalworking, it could be beneficially applied by scrap industrymen. One session was devoted to getting the most out of equipment, and 31 manufacturers had machinery and equipment on display.

Irwin H. Such, STEEL's editor, told the convention that the steel industry will provide continued active demand for scrap in the next several months. Donald H. Workman, executive vice president, Gray Iron Founders' Society, discussed the outlook for castings. Other topics: Fair trade, research, foreign trade and safety.



Wind Tunnel Gets New Muscle

Two 20,000-hp Westinghouse motors replace original 12,000-hp unit in California Institute of Technology's tunnel. Air speeds up to Mach 1.80 will be attainable. The old motor will be revamped to provide starting power



Pentagon Comes to Industry

"THE END of the production line is the start of the firing line." That thinking is behind the Defense department's industrial mobilization planning meetings scheduled for Boston tomorrow (STEEL, Dec. 19, p. 54) and in Philadelphia on Jan. 19-20.

Aimed at companies not doing defense work but which would be if war came (electronics, metal products, etc.), the meetings stress the "where do you fit in?" idea. On the agenda: stockpiling, layaway of industrial equipment, preparedness and maintenance.

Technical Accent — One reason for the success of meetings already held in San Francisco and Los Angeles: Emphasis is on featuring the best technically informed Defense department people rather than "big names."

The meetings recognize that: 1. One of our tremendous military resources is the ingenuity of industrialists — but an industrialist well informed on what the military wants is a much better asset than just a willing one. 2. Businessmen can't be expected to keep up with day-to-day changes in defense requirements.

Check—If you are one of the 24,000 firms listed in the "Register of Planned Mobilization Producers," you can, at the meetings, check your listing to see if: 1. Your registration is complete and up to date. 2. Your plant survey reflects your present potential, includes all plants and operations.

Using that information, you can analyze the production schedule already accumulated to see if: 1. It's still in effect. 2. It's compatible with your present tooling. 3. It's for an item that may have been replaced. 4. You are overplanned or underplanned.

A checkup now could save you from running around trying to find out who can buy what you can make in wartime.

More Coming—The official view is that more meetings will be held. It's felt that the payoff is big—such as saving time of businessmen who have been coming to Washington wanting to know where they'd fit into war production and maybe, or maybe not, finding the man with the right answer. Hampering the plans: The meetings make a big drain on Defense department manpower.

Getting Out of Business

The Defense department has under way its sixth review of industrial and commercial facilities aimed at getting the government out of business. Included are: Nonferrous foundries, sheet metal work, stamped and pressed metal products, electroplating, plating and polishing, lighting fixtures, screw machine products, machine tool accessories, machine shops and ship repair. Reports are due next September.

Buying Practices

The Senate will take a look at Armed Services buying practices following the report of the House Armed Services Committee. Under fire: Too much buying by negotiated contract, not enough by competitive bidding. Sen. John Sparkman (Dem., Ala.), chairman of the Senate Small Business Committee, has set hearings for March.

Investments Abroad

Predictions have been made that Congress will take no action this year on reducing the tax rate on corporate income earned outside the U. S. The treasury recommended a 14-point tax cut aimed at encouraging investment abroad.

Meet Charles M. Stuart: As director of the Business & Defense Services Administrations' General Industrial Equipment Division, Mr. Stuart will head up liaison between industrial firms and government.

He's on loan from Carrier Corp., Syracuse, N. Y., where he is assistant to the executive vice president.

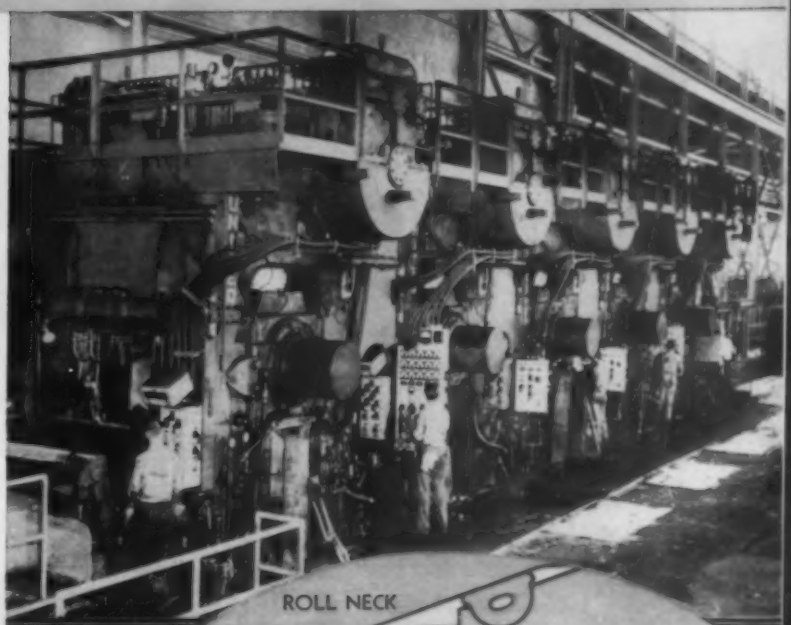
The MORGOIL FLINGER

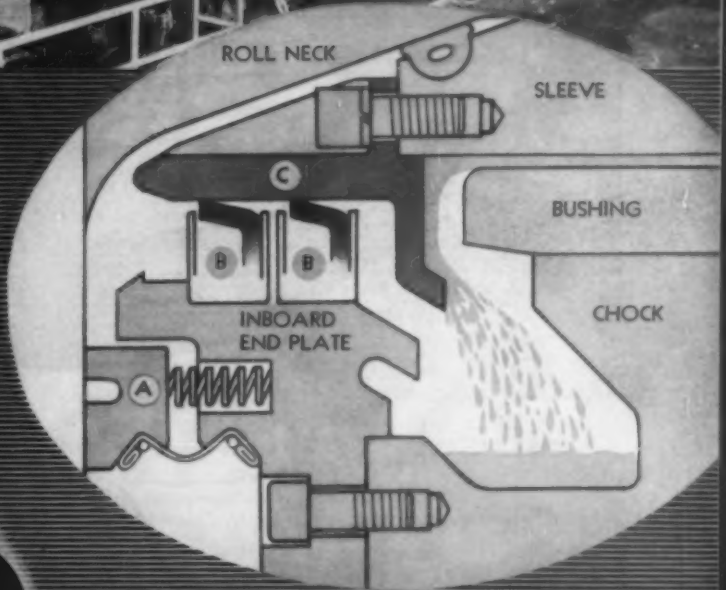
Stops oil loss on mills using rolling lubricant

The rotating sleeve extension and flinger "C" throws all of the oil from the bearing into the drain sump. **No more oil loss through worn seals.**

The water seal assembly "A" and the oil seals "B" of a modern MORGOIL serve only one purpose — to keep rolling lubricant out of the bearings.

This five stand tandem four-high cold mill at Kaiser Steel Corp., Fontana, California rolls on modern MORGOILS equipped with sleeve extensions and flingers.





MORGAN CONSTRUCTION COMPANY

WORCESTER, MASSACHUSETTS

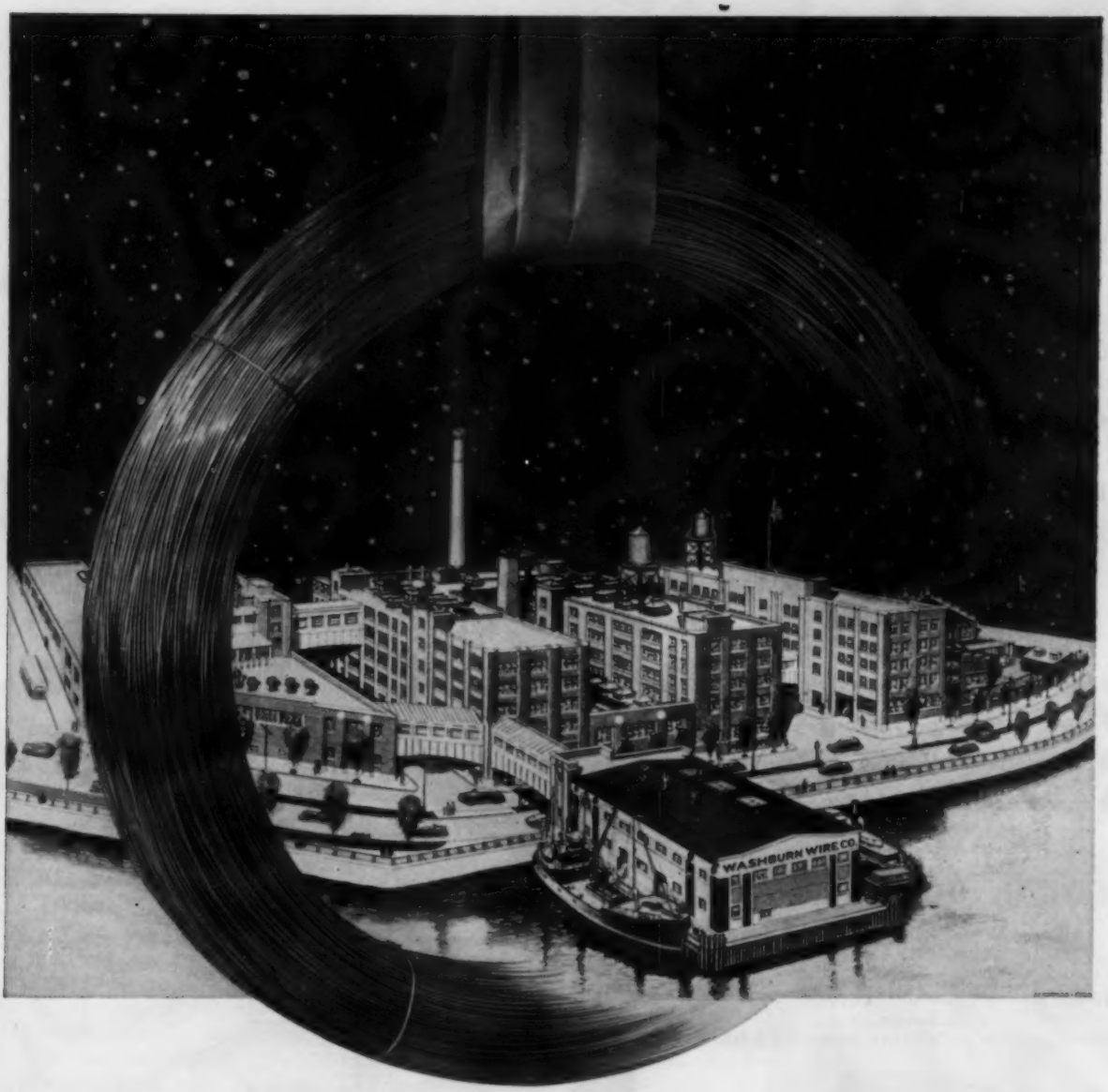
ROLLING MILLS MORGOIL BEARINGS GAS PRODUCERS
WIRE MILLS EJECTORS REGENERATIVE FURNACE CONTROL

English Representative
International Construction Co., 56 Kingsway, London W. C. 2, England

MB-2BR

MORGOIL

the best Roll Neck Bearing you can buy



Best Wishes for a

Happy New Year

WASHBURN WIRE COMPANY, NEW YORK CITY

WASHBURN

CLEAN, UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

Jim Vaughn Boosts Office Productivity

THE ASSEMBLY LINE isn't the only place to improve productivity. Substantial cost economies can be gained by improving efficiency in administrative and office functions, says James S. Vaughn, vice president, Square D Co., Detroit.

Take the productivity increases in Square D's sales-order-tabulating sections. When Mr. Vaughn and his associates tackled the job, they first had to set up some method of measuring "paper-work" productivity. Their goal: A yearly reduction in costs equal to the wage productivity increase granted to employees.

Plan of Attack—Total personnel and the hours they worked were related to the number of invoices handled, tonnage of products shipped and the units of paper necessary to handle each ton of shipments.

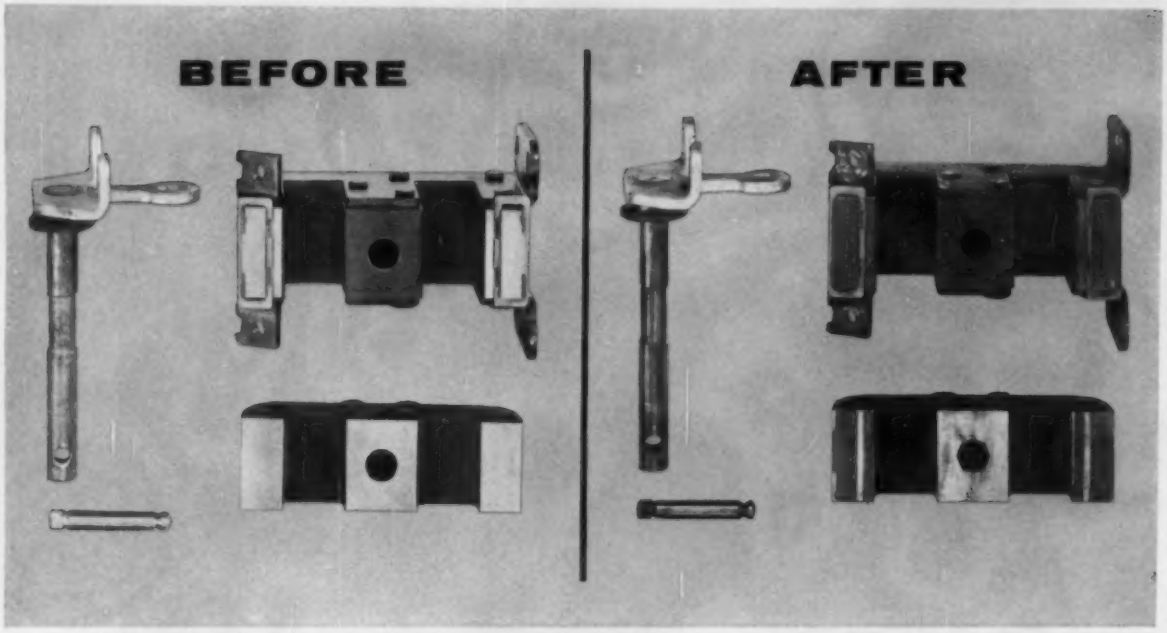
Biggest factor in increasing efficiency in these order handling sections was the elimination and consolidation of clerical processing through mechanization—IBM machines and punch cards.

Victory—A look at these comparisons gives you an idea of the program's success: In 1950, the monthly averages were: 52 employees handled 18,775 orders and invoices; 17.7 units of paper were used for each ton of products shipped, with 8.50 hours of work required for each ton. In the first half of this year, the averages were: 55 employees handled 20,539 orders and invoices; 15.2 units of paper were required for each ton shipped, with 7.04 hours of work required per ton.

In the pilot stage is a system of tying in Square D's 50 regional offices with the sales-order-tabulating sections via perforated tape network.

The Man—Mr. Vaughn's own personal "productivity" record at Square D has been one of rapid achievement. After a five-year stint in the Army Signal Corps and discharge as lieutenant colonel, he joined the company as a student engineer in sales at the Milwaukee plant. His rise has included these positions: Plant manager of the Peru, Ind., plant; factory manager in Detroit; and general manager of the Distribution Equipment Division. He was made vice president of the division in September.

Like many of metalworking's top executives, Mr. Vaughn's talents are not limited to his company activities. His hobby is music, and his favorite instruments are the organ and carillon. He is assistant organist at his church.



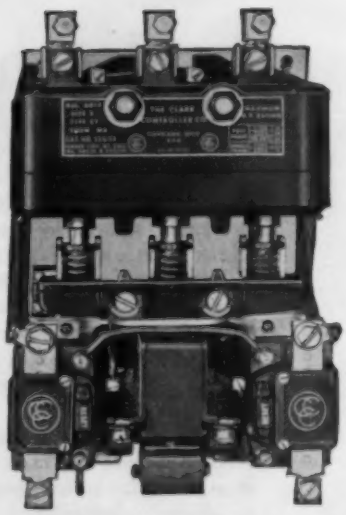
PROOF OF LONG LIFE OF CLARK TYPE "CY" STARTERS

These unretouched photos show magnet parts of a CLARK Bulletin 7707 Contactor—the contactor used on standard CLARK Bulletin 6013, Size 2, Type "CY" AC motor starters—as they looked before and after nearly 3 years of continuous service. During this time the contactor opened and closed 4 to 5 times per minute, 24 hours per day, 7 days per week—a total well over 5 million operations.

The contactor was in service at Taylor Instrument Companies, Rochester, N. Y., on a "Hevi-duty" molten salt pot electric furnace used for instrument calibration. It was installed *after several contactors of another make had failed in 4 months or less.* Our contactor was still performing perfectly when it was replaced by another identical unit, so that we could study the magnet wear.

All wearing surfaces were carefully "miked" and each dimension compared with the original. As seen in the "before and after" photos, wear was barely apparent to the naked eye. Micrometer readings showed actual wear measurable only in thousandths and ten thousandths of an inch. Only a fraction of the usable life had been consumed.

Write for descriptive literature.



CLARK Type "CY" Starters *include many more features for dependable service and reduced maintenance. Let us tell you the complete story.*

The **CLARK CONTROLLER** *Company*

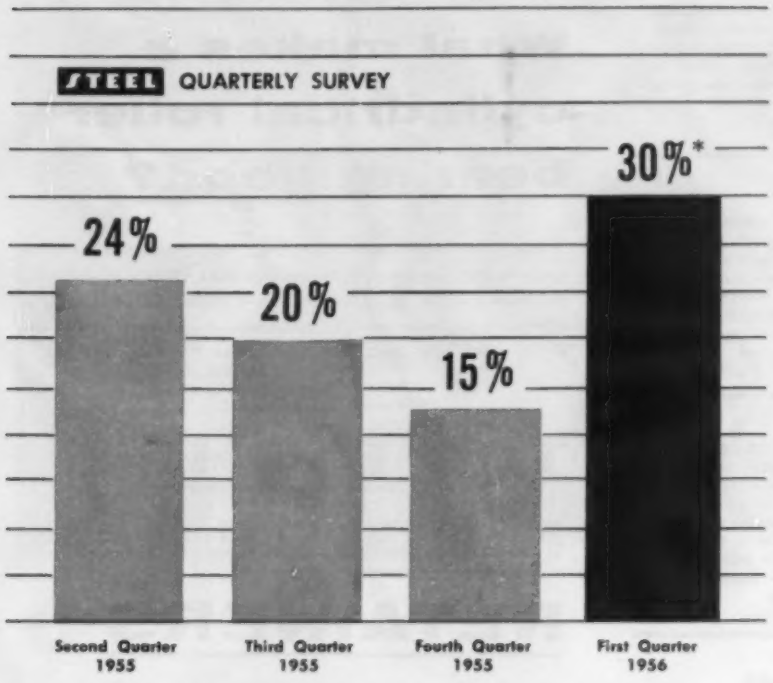
Engineered Electrical Control

1146 East 152nd Street • • Cleveland 10, Ohio

IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

Major Industrial Components

(% of respondents who added to inventories)



Survey includes: Bearings, castings, hose couplings, cylinders, electrical equipment, fasteners, forgings, gears, mechanical rubber goods, screw machine products, springs and wire shapes, stampings, weldments.
*Estimates of respondents

Strong Demand Expected

MATERIAL SHORTAGES are filtering down to component parts. And like the common cold, the situation probably will be worse before it gets better.

In the fourth quarter of 1955, some 23 per cent of STEEL's quarterly inventory respondents hoped to add to their inventory, but only 15 per cent were able to do so.

For the first quarter of this new year, 30 per cent want to fatten inventories. This is an all-time high, and it's doubtful if all can make it.

Steel Is Tight—Steel is still the bugbear. There just isn't enough to go around. Says a Philadelphia purchasing agent: "Steel is slowing up production . . . nickel is making my hair fall out."

A New Jersey company reports: "Incoming orders are such that we could use a higher inventory and work overtime if carbon steel bars and forgings were more available."

From Wisconsin: "Deliveries are being missed because suppliers are short of steel or overbooked."

First Aid—There's a possibility that lower automobile production may help ease the steel shortage. But that's something that won't be known until automakers figure out whether the 1956 car-buying public got ahead of itself with last year's models.

Current production predictions for autos are pegged pretty close to 7 million. If that holds up, more steel will be available for other industrial uses.

Percentages—Despite half-empty shelves, most manufacturers still are optimistic. About 45 per cent feel that the inventory situation will improve this next quarter. Another 45 per cent think it will be the same, and 10 per cent say inventories will be worse.

Deliveries—Almost 80 per cent of the companies responding feel that deliveries from suppliers are adequate, but only when enough lead time is allowed. Having become somewhat used to the idea of boom production, most manufacturers are putting in orders well in advance to make sure delivery dates will be met.

Bearings are the biggest headache for purchasing agents. Deliveries of three to six months are typical. One manufacturer says he needs a ten-month lead. You're lucky if you can get them in less than 90 days.

Tight Items — Other trouble spots are screw machine parts, motors and castings. Most of these run in the 60-to-90 day delivery range. Once more steel is the problem. An Ohio firm sums up the casting situation this way: "Steel casting deliveries are terrible; forgings not quite as bad. Gray iron castings—easy."

Summary — With those exceptions, delivery time on other components runs around 30 to 60 days. That's what it was last quarter, and that's about what it will be for this quarter, too.

Beechcraft Sales Hit Peak

Commercial aircraft sales of over $27.4 million were up 40 per cent over 1954's record total for Beech Aircraft Corp., Wichita, Kans.

Mrs. O. A. Beech, president of the company, expects commercial sales for 1956 to top $32 million. Firm orders for $11.5 million worth of 1956 Beechcraft executive planes have been received.

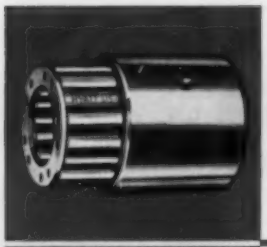
The line of new business planes includes a four-place, single-engine plane; a six-place, twin-engine model; and an eight-place, twin-engine executive transport.

Smaller Auto Tire Planned

Goodyear Tire & Rubber Co., Akron, admits it is in the "later stages" of developing an automobile tire 14-in. in diameter.

E. J. Thomas, president, explains: "These new tires will be of lesser wheel diameter, bigger cross section and will carry 20 lb of pressure."

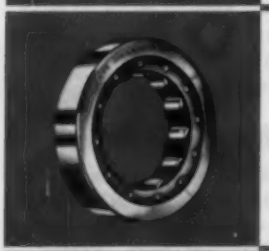
This will lower auto silhouettes. Present tires are 15-in. in diameter and are inflated to 24 lb. Other companies also are working on the new tire.



TRUNNIONED ROLLER CAGE—Economical for volume use on thin-annulus bearings. End rings are hardened steel stampings, connected by riveted bars interspersed between rollers to form an integral unit. Races can be omitted if desired.

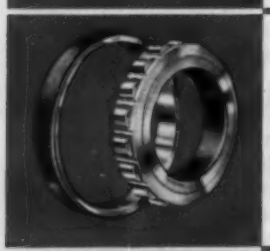
POCKETED END RING CAGE—Designed for fairly large bore bearings in heavy-duty service. Rollers are guided accurately by pockets drilled in bronze end rings. Riveted connecting bars form an integral unit, so races can be omitted if desired.

STAMPED STEEL SEPARATOR—Economical for volume use on wide range of bearings with short rollers. A single steel stamping with bars coined to conform to roller contour. Simple, open design assures large lubricant capacity and good circulation.



FORMED BAR CAGE—Well adapted for volume use on heavy-duty bearings. Hardened steel end rings are connected by cold-rolled shaped bars conforming to roller diameter. Insures quiet operation, better roller guidance, and the smooth surface of bars protects rollers.

DRILLED POCKET CAGE—Used on better-grade bearings to provide extremely close control of rollers, which operate in pockets drilled and reamed in bronze cylinder. Riveted ring on one end retains rollers permanently, so races may be omitted if desired.



SEPARABLE BROACHED POCKET CAGE—Used only on finest high-speed bearings. An integral bronze cylinder with pockets broached for maximum uniformity. Insures minimum friction, better oil circulation for cooling. Rollers can be removed for inspection.

NON-SEPARABLE BROACHED POCKET CAGE—Similar to the above and offers all the same operating advantages. Used for "blind" installations where rollers must be retained with inner or outer race. Roller drop controlled by deforming bars after rollers are placed.

What makes a cylindrical roller bearing good?

When you buy a roller bearing, you expect it to do a certain job for you. How well it does that job depends on many different factors. This series of messages is designed to help you recognize some of these important differences and get more for your bearing dollar.

The RIGHT KIND OF RETAINERS for the application

The basic parts of a roller bearing are the rollers, the races, and the *retainer* which locates and guides the rollers. There are significant differences in the design and construction of retainers, which influence bearing cost and performance. Some are simple and economical, well adapted for volume production; others are more costly but insure improved roller guidance, or cooler and smoother operation, or longer heavy-duty service. The seven basic types in current use are illustrated.

HYATT MAKES ALL SEVEN TYPES . . . EACH THE FINEST OF ITS KIND! **You will find complete details in HYATT General Catalog No. 150, or your nearby HYATT Sales Engineer will gladly help you choose the type best suited to your requirements. Remember, HYATT is America's *first* and *foremost* maker of cylindrical roller bearings. Hyatt Bearings Division of General Motors, Harrison, N. J.**

GM GENERAL MOTORS

HYATT

ROLLER BEARINGS

White Motor Co.'s 9000 tractor measures 90-in. from bumper to rear of cab

White's Merger Philosophy

WHITE MOTOR CO., Cleveland, recently was blocked in its attempted merger with Diamond T Motor Car Co., Chicago. The stalemate brings to light a different viewpoint in today's race for diversified expansion.

White's president and chairman, Robert F. Black, points out: "We are not interested in expanding just to pick up diversified companies. Our interest is in stabilizing our truck business."

Pattern — Behind this stabilization is a carefully designed pattern aimed at just one goal: Making White Motor Co. the leader in the heavy-duty truck field.

The concept embraces more than a series of mergers. Before returning for a further look at the Diamond T incident, let's see how White got to the top and why the company feels it can stay healthy without diversification.

Good Year—White enjoyed sales of close to $175 million in 1955. Translating dollar sales into registrations, White picked up 17.5 per cent of the estimated 79,300 heavy-duty trucks registered in 1955. These were all in the 19,501-lb-and-over gross vehicle weight class. That's White's specialty, and the only class which it wants to dominate.

Of the other truckmakers, International, which White does not regard as an independent, got 27.5 per cent of the market. Ford and General Motors each took 14 per cent, and Mack lopped off 13 per cent. Some 20 independent companies picked up the rest. Mr. Black is quick to point out that he does not consider White in the same field as independent automobile producers.

This year, heavy-duty truck and tractor output is estimated to be about 80,000. White is shooting for an even 20 per cent of that figure.

History—White Motor Co. is an offshoot of the White Sewing Machine Co., which was started by Thomas H. White in 1859 at Templeton, Mass. In 1900, under the leadership of sons Rollin, Windsor and Walter White, the present company was formed in Cleveland to manufacture the White Steamer.

After switching to a gasoline engine, White decided to drop its passenger car line in 1918 and concentrate on the more profitable truck field. Robert Black became president of the company in its dark days of 1935. He brought two ideas to White—service and research.

Research—Among White's engineering "firsts" are its tilted engine, designed for trucks and the cab-over-engine idea which cut body length. Today, White almost can be called the custom maker of the 19.5 thousand-lb-class truck and tractor business. It claims 3500 different combinations based on four-wheel, six-wheel or truck-trailer chassis in that weight class.

Prices are high on these special jobs. Basic list prices for two stripped chassis on the heavy-duty rigs start at $5000 and $21,000. With the many combinations of added extras, the tab can go as high as $47,000. It's all part of the White policy of fitting the truck to the job.

Although it sticks with its gasoline engine, White also installs diesels. In the first ten months of 1955, 6.5 per cent of its trucks carried diesel engines. They come from Cummins Engine Co., Columbus, Ind. Lower fuel costs favor diesels, but White spokesmen point out that the old truck bugaboo, weight, keeps gasoline engines ahead.

"Public concern over diesel fumes is another factor," one company man reports. "Recent tax hikes on diesel fuels to help pay for state and federal highway programs, have kept diesel-powered trucks out of many states."

Service—Regenerated some ten years ago, White's parts sales and service program has insured return customers. A broad network of 210 distributors, 129 dealers and 82 service stations, together with the company's 40 branches, give

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White strong representation.

Much of the credit for privately owned distributorships goes to White's policy of giving employees a helping hand dollarwise. "Twenty-five per cent of our distributors are former White associates," Mr. Black declares.

Mergers — As it grew, White picked up companies which it felt could best help in aiming for excellence in the heavy-duty field. First acquisition was Sterling Motor Co., Milwaukee, in 1951.

Originally, White planned to develop the Sterling line to fill in gaps in its own coverage. But in 1953, it had a chance to pick up the foundering Autocar Co., Exton, Pa. Sterling was integrated directly into White's organization and Autocar, maker of heavy-duty, off-the-highway trucks, has been developed as a supplemental line. Mr. Black asserts: "This last year has been the highest peacetime year for Autocar since World War II."

Another recent addition is National (now White) Diesel Engine Division, Springfield, O. Currently developing heavy-duty stationary diesels, it seems likely that White may soon put more effort into beating the weight problem of diesel engines for its trucks.

Concerning the ill-fated Diamond T merger, Mr. Black admits that the company could have fitted nicely into White's pattern. "During our negotiations with the management and stockholders of Diamond T, we made what both companies considered to be a fair offer," he says.

Trouble developed when some officers and directors of Bohn Aluminum & Brass Corp., Detroit, started looking for a tax-payment vehicle for the newly acquired Reo Motors Inc.

The Bohn officials bought up a blocking number of shares of Diamond T common stock at a price higher than White could or would pay. Result—stalemate. Neither White nor Bohn can merge Diamond T. Outcome: Still to be determined.

But as Mr. Black puts it: "White essentially is a truck builder in the narrow, heavy-duty field. We are not actively considering any mergers, but any we do make will have to fit that pattern."

U. S. Auto Output

Passenger Only

	1955	1954
January	659,719	456,765
February	675,769	443,257
March	794,188	526,076
April	754,007	533,470
May	724,891	494,250
June	649,372	504,811
July	659,979	441,451
August	614,392	436,650
September	461,592	285,860
October	517,669	236,635
November	748,559†	508,466
December		641,971
Total		5,518,662

Week Ended	1955	1954
Dec. 3	177,712	144,995
Dec. 10	178,409	148,692
Dec. 17	169,256	151,924
Dec. 24	150,881	124,854
Dec. 31	105,182†	124,250
	1956	1955
Jan. 7	108,000*	150,585

†Preliminary *Estimated by STEEL
Source: *Ward's Automotive Reports*

Mercury's Montclair Phaeton

This 225-hp hardtop features extra eye-level visibility for rear seat riders. The low-silhouette Phaeton also is available with a 210-hp, V-8 engine and standard transmission. Like all 1956 Mercurys, the Phaeton has a safety steering wheel and five other "crash-tested" safety features

Willys Gets Jeep Dispatcher

Willys Motors Inc., Toledo, O., has announced a two-wheel-drive, light delivery vehicle called the Jeep Dispatcher.

Hickman Price Jr., Willys vice president in charge of sales, describes it as a low-initial-cost, compact, economical unit designed to fill a vacancy in utility vehicle transportation.

Delivery prices start at $1284. Three models are offered—a basic vehicle with or without canvas top, a hardtop model and a soft-top convertible.

Introduction of the dispatcher will mark the first time Willys has offered conventional two-wheel drive on a basic Jeep unit, although it has been optional on Jeep station wagon and sedan delivery models.

Over-all length is 126-in., with an 80-in. wheelbase for traffic maneuverability. Willys expects a strong foreign demand, as well as a sizable market among small businesses in metropolitan areas.

Exhaust Notes . . .

L. L. Colbert, president, Chrysler Corp., Detroit, reports that 28 lines of stamping presses will go into the company's Twinsburg, O., plant . . . General Motors Corp. Truck & Coach Division will be showing off its road shock dampers for light trucks at the Chicago Automobile Show, Jan. 7-15 . . . Crosley cars (discontinued in July, 1952) are reported gaining in demand. Dealers say they can sell all they can get . . . Recent rumor —trouble-free, tubeless tires may put an end to the automobile jack and spare tire . . . Elliott's Car Farm, Bedford, O., offers to take in trade anything from antiques to eggs as down payment on '56 models.

FACTS

about

NEW DEPARTURE
BALL BEARINGS

Self-sealed bearings simplify design... cut maintenance costs

New Departure originated self-sealed ball bearings to eliminate the most common causes of bearing wear and failure—such as abrasive dirt and improper lubrication. Since then, more than 300,000,000 New Departure sealed bearings have been produced in various types to fit the specific requirements of industry. Seals are available to keep out foreign matter, ranging from dust and dirt to corrosive gases . . . to retain lubricants, varying from heavy grease to light oil . . . to provide the protection that assures longest life.

New Departure's latest advance, Sentri-Seal, embodies exclusive features which importantly improve both bearing performance and range of application. Because of its design, Sentri-Seal provides controlled, highly efficient sealing with low torque and is not materially influenced by axial movement due to bearing end play within prescribed tolerances.

Sealed ball bearings offer the electric motor and machine tool builder many advantages. They simplify design, make it possible to mount motors in any position, cut maintenance to a minimum, and eliminate the need for relubrication for long periods of operation.

WRITE FOR COMPLETE INFORMATION ON NEW DEPARTURE SEALED BEARINGS!

NEW DEPARTURE • DIVISION OF GENERAL MOTORS CORPORATION • BRISTOL, CONN.

WHEN the problem is a rush hollow parts job, phone or wire the Timken Company and we'll ship less-than-mill quantities of 52100 tubing within 24 hours after receiving your order.

Timken® 52100 steel tubing is excellent for most of your high quality hollow parts jobs. It's a through-hardening steel in moderate sections. It can be heat treated to file hardness and tempered back to any desired point. And it can frequently be used in place of more expensive steels.

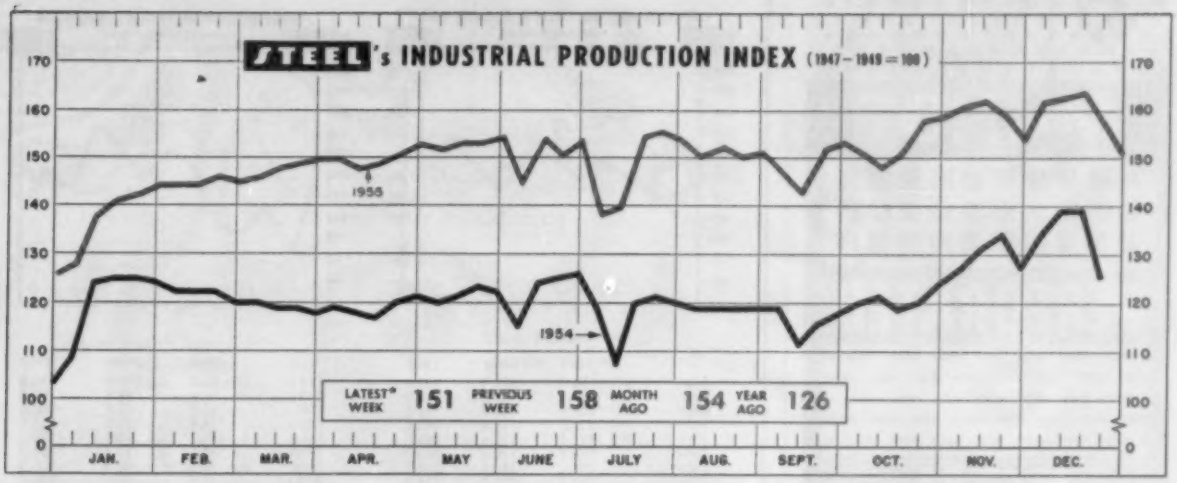
Available in sizes from 1" to 10½" O.D., Timken 52100 steel is used for hollow parts such as: aircraft parts, ball bearing races, pump parts and plungers, collets, bushings, spindles, grinding machine parts, precision instruments, and dozens of others.

The Timken Company is America's pioneer producer of 52100 tubing. And we're the only company that makes 52100 steel in tubing, bars and wire. Our unequalled experience assures you of uniform quality from tube to tube and heat to heat.

For immediate delivery of your less-than-mill quantity orders, write, wire or phone The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Dec. 31. Based upon and weighted as follows: Steel Output, 35%; Electric Power Output, 32%; Freight Car Loadings, 22%; and Auto Assemblies, 11%

New Year Looks Better Than Old

BUSINESS PROGNOSTICATORS are having a heyday with 1956! If their collective crystal ball is telling the truth, 1956 is going to be the best ever for almost any segment of industry you choose.

One of the most impressive forecasts comes from the National Industrial Conference Board's Economic Forum, which predicts that this new year will see a gross national product between $405 billion and $410 billion. The forum, composed of experts from industry, banking, education and government, goes contrary to most forecasts for '56 in that it anticipates a mild increase for second half.

Four Strengths — The NICB group says among the main elements which will hold 1956 on such a high level are: Expansion plans for most segments of industry; further accumulation of inventories; the pressures of population, resulting in an increase in state and local spending of $400 million or $500 million per quarter; and the possibility of tax relief. But increasing signs of strain and stress will require business to keep a close watch on second half, especially toward yearend.

Sinclair Weeks, secretary of commerce, says: "The economic outlook is clearly excellent for the first six months of 1956. . . It would not be surprising if, later on, some parts of the economy experienced breathing spells as they adjust from the current extraordinary rate to a more normal rate of growth."

Some of the highlights in Mr. Weeks' survey are:

Iron and Steel—First half will be one of the highest, if not *the* highest in history. Shortages will remain, especially in nickel-bearing steels, but that won't mar the over-all record.

Construction — New construction expenditures will be $44 billion, 5 per cent above the record $42 billion in 1955, despite fewer starts on nonfarm dwellings.

Electronics—Production will set a

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,373[1]	2,309	1,960
Electric Power Distributed (million kw-hr)	11,620[1]	11,614	9,431
Bitum. Coal Output (1000 tons)	10,270	10,500	7,475
Petroleum Production (daily avg—1000 bbl)	6,900[1]	6,992	6,401
Construction Volume (*ENR*—millions)	$250.0[1]	$458.4	$216.1
Auto, Truck Output, U. S., Canada (*Ward's*)	121,632	177,250	148,436
TRADE			
Freight Car Loadings (1000 cars)	675[1]	672	529
Business Failures (Dun & Bradstreet)	210[1]	181	152
Currency in Circulation (millions)[3]	$31,415	$31,364	$30,638
Dept. Store Sales (changes from year ago)[3]	+8%	+6%	+16%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$21,500[1]	$24,569	$19,205
Federal Gross Debt (billions)	$280.7	$280.6	$278.7
Bond Volume, NYSE (millions)	$14.9	$18.1	$26.4
Stocks Sales, NYSE (thousands of shares)	9,007	11,938	18,486
Loans and Investments (billions)[4]	$86.8	$85.7	$86.6
U. S. Govt. Obligations Held (billions)[4]	$30.2	$29.6	$37.2
PRICES			
STEEL's Finished Steel Price Index[5]	208.90	208.90	194.53
STEEL's Nonferrous Metal Price Index[6]	270.1	270.2	216.0
All Commodities[7]	111.4	111.2	109.6
Commodities Other than Farm & Foods[7]	119.5	119.5	114.8

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278; 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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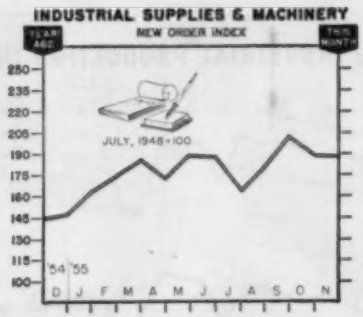
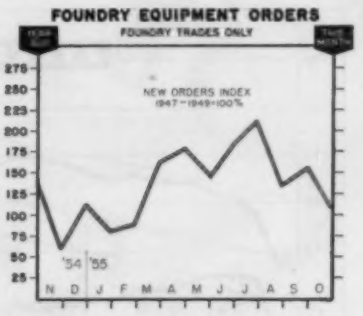
THE BUSINESS TREND



	1955	1954	1953
Jan.	164.4	139.8	157.4
Feb.	175.1	140.5	172.9
Mar.	186.9	141.5	188.2
Apr.	173.7	131.9	182.1
May	191.6	129.4	171.1
June	189.1	136.4	160.0
July	163.7	119.4	155.3
Aug.	181.2	132.5	139.6
Sept.	203.2	148.1	150.6
Oct.	190.0	136.3	146.0
Nov.	189.7	146.2	144.8
Dec.	....	148.8	136.7

Amer. Supply & Machinery Mfrs.' Assn.



	1955	1954	1953
Jan.	81.0	173.8	99.6
Feb.	90.4	99.9	97.5
Mar.	163.6	82.7	132.2
Apr.	178.6	125.3	111.8
May	145.7	80.8	182.1
June	186.8	86.4	156.4
July	213.4	68.8	158.9
Aug.	134.0	75.6	235.5
Sept.	156.7	68.3	127.7
Oct.	108.6	147.5	87.1
Nov.	....	81.4	149.4
Dec.	....	113.9	160.8

Foundry Equipment Mfrs. Assn.

Charts copyrighted, 1956, STEEL

record of about $6.8 billion, or about $500 million ahead of 1955.

Machine Tools—Shipments of both cutting and forming types in first half will climb to $430 million compared with $409 for the same 1955 period.

Agricultural Machinery — Unit production will hold at 1955 levels, but price increases will mean a 5-to-10 per-cent increase in dollar volume this year.

Office Machinery—Gains in first half will range between 10 and 15 per cent ahead of first half last year.

Consumer Durable Goods — Sales through midyear will equal or slightly exceed the record rate of 1955.

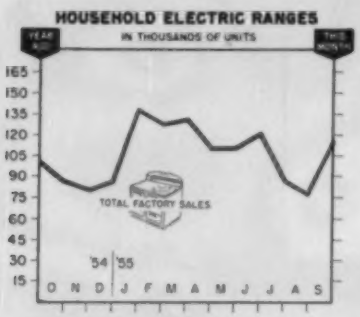
Trade Groups Add Support

The National Association of Purchasing Agents, in its monthly survey of business, found that 76 per cent of the respondents believe the current level of business will continue through the first two quarters. Another 17 per cent are thinking in terms of better business, and only 7 per cent look for a dip.

The American Supply & Machinery Manufacturers' Association Inc. adds its weight to the plus side when it says: "As we enter 1956, the favorable factors so far outbalance the unfavorable that another excellent year seems to be in prospect."

Time Out for Santa

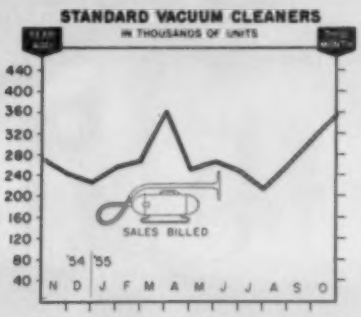
STEEL's own industrial production index, after hitting the all-time high of 165 (1947-1949=100) in the week ended Dec. 17, gave way to the holiday spirit and dipped to 158 the following week and on to an estimated 151 for the last week of the year. Thus, 1955 bowed out 25 points ahead of 1954. Electric power, steel production and freight car loadings kept reasonably close to the fast pace in the waning moments of 1955, but automobile production fell to the lowest rate since model changeover time. *Ward's Automotive Reports* estimates only 118,769 cars and trucks were turned out in the week ended Dec. 31. This was the result of a shift to a five-day week by most producers and the interruption of production by Christmas and New Year's holidays. Basic to these cutbacks, however, is the feeling that motordom is overproducing. Stocks of unsold new cars are building up as sales slide off. Even the used-car mar-



Total Factory Sales—Units

	1955	1954	1953
Jan.	136,663	101,870	88,145
Feb.	127,188	109,647	114,465
Mar.	130,180	115,393	130,783
Apr.	108,619	92,751	118,999
May	109,263	82,649	114,404
June	120,100	85,854	113,086
July	85,659	80,017	77,836
Aug.	76,158	75,907	74,326
Sept.	115,500	99,611	84,481
Oct.	.....	84,321	73,422
Nov.	.....	79,340	55,748
Dec.	.....	85,033	73,870
Total	.....	1,092,393	1,119,570

National Electrical Mfrs. Assn.



Sales Billed—Units

	1955	1954	1953
Jan.	250,123	221,233	255,886
Feb.	262,651	199,035	246,007
Mar.	358,179	276,464	329,294
Apr.	244,143	220,849	268,548
May	261,238	200,434	252,404
June	241,665	195,781	197,506
July	207,758	193,607	159,446
Aug.	255,540	185,397	188,536
Sept.	308,345	238,235	227,253
Oct.	350,696	263,197	249,383
Nov.	307,545	237,882	216,227
Dec.	.....	217,022	190,773
Total	.....	2,658,136	2,781,263

Vacuum Cleaner Mfrs. Assn.

ket is slow, values having fallen between $100 and $200 for some models since last June.

But the sights are still set high for auto production this year. *Ward's* says that first-quarter schedules call for some 330,500 units, 4 per cent above fourth quarter, 1955, and the best first quarter since 1953. Harlow H. Curtice, president of General Motors Corp., estimates that 7,060,000 cars and 1,190,000 trucks will roll off the assembly lines this year, making 1956 the second highest production year in history. L. L. Colbert, president of Chrysler Corp., says he is "confident the growth in demand for cars will be continued and strengthened" in 1956 and beyond. George Romney, president of American Motors Corp., while predicting a production decline of 15 per cent for 1956, says he expects his own company to do better than in 1955.

Carmakers Welcome Flood

Railroads will be a mainstay in 1956. Edward G. Budd, president of Budd Co., believes his company's over-all sales picture in first quarter will be about equal with the record first quarter last year. He believes there will be a flood of passenger car business in late 1956. The flood seems to have started, with shipments totaling 561 cars during September and October. Shipments during the preceding 12 months totaled only 536 cars, according to the American Railway Car Institute.

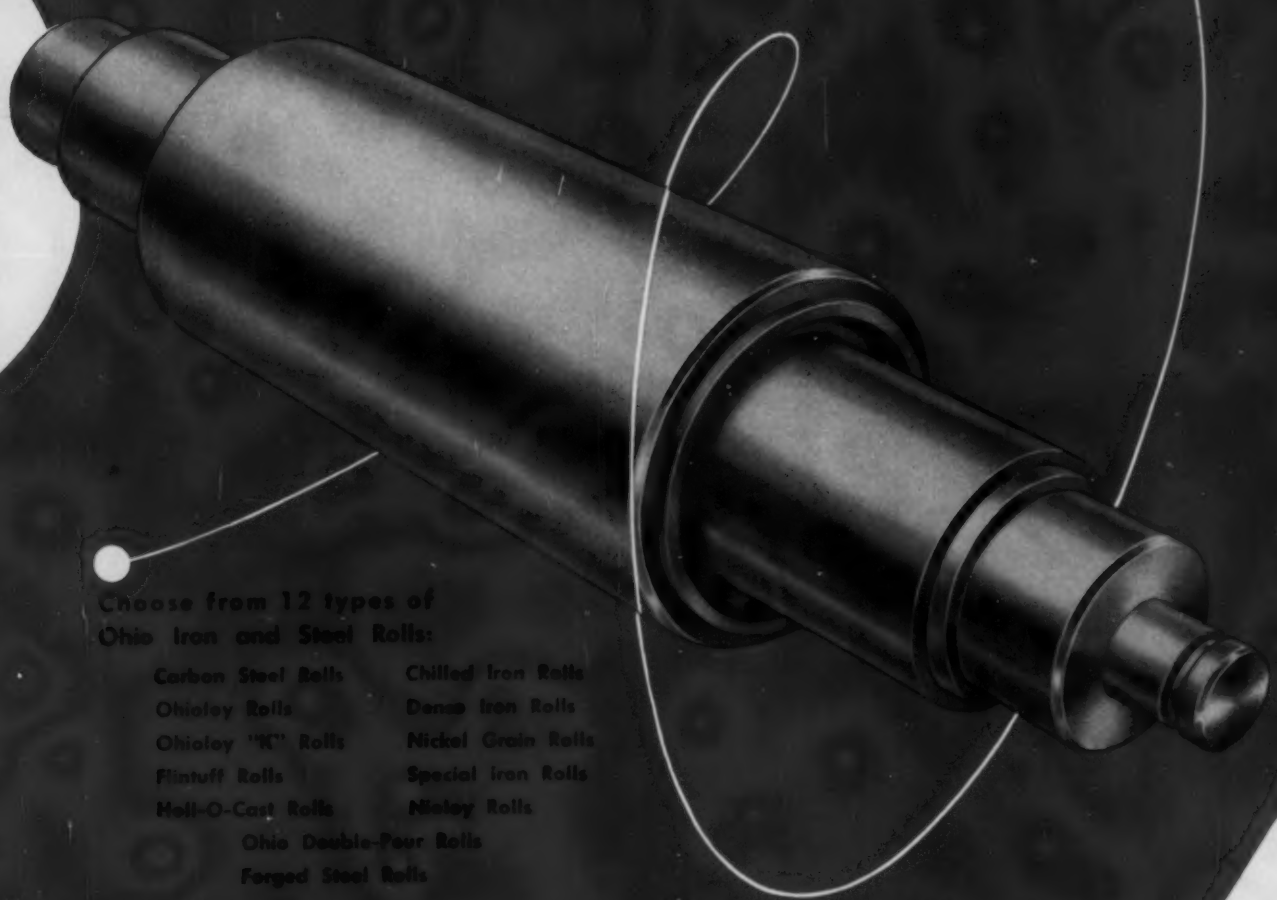
Continuing the pace of the last half of 1955, revenue freight car loadings in first quarter will increase by 8.3 per cent over the year-ago quarter, estimates the Association of American Railroads. This is putting more pressure on carbuilders, who are entering 1956 with orders on the books for about 135,000 new freight cars, according to William T. Faricy, president of AAR. Railroads will spend more than $1 billion for plant and equipment this year, he says.

No Letup for Construction

Construction looks good whether you take the long-term or short-term outlook. F. W. Dodge Corp. says 1956 will mark the eleventh consecutive year of increase in over-all building and engineering volume. Over the next decade, $450 billion worth of new construction may be built, the firm says.

Ohio Rolls

shaping metal for all industry



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OR1

DONALD M. PATTISON
. . . Motch & Merryweather v. p.

CHARLES R. CROWDER
. . . heads Van Norman Machine Co.

RICHARD C. BANNON
. . . Waterbury Farrel v. p.-sales

Donald M. Pattison was elected vice president of **Motch & Merryweather Machinery Co.**, Cleveland. Formerly director of marketing, he continues those duties in directing sales policies of the company.

Woodford D. Miller was made executive vice president in charge of eastern operations of **Robertshaw-Fulton Controls Co.**, New York. He is succeeded by **Frank H. Post** as vice president and general manager, Robertshaw Thermostat Division, Youngwood, Pa. **George Mertz** was made assistant to the general manager of that division, in charge of manufacturing. **Freeman G. Cross** succeeds **Jean V. Giesler**, who is retiring Feb. 1 as general manager, Fulton Sylphon Division, Knoxville, Tenn.

Ben Kaufman was made general manager, Ajax Metal Division of **H. Kramer & Co.** at Philadelphia. He succeeds **Sidney Danziger**, who remains a vice president of the company at New York.

Allegheny Ludlum Steel Corp., Pittsburgh, elected **William B. Pierce** vice president-sales to succeed **Russell M. Allen.** Mr. Pierce was vice president and technical director. Mr. Allen continues as vice president and director. **Dr. Rush A. Lincoln** was made technical director. He was chief metallurgist.

Van Norman Machine Co., Springfield, Mass., elected **Charles R. Crowder** president; **Roger S. Pyne**, vice president; **T. W. Baush**, vice president; **R. W. Porter**, treasurer-secretary; and **Samuel McCullough**, assistant treasurer.

William L. Neilson Jr. was made general sales manager, **Greenfield Tap & Die Corp.**, Greenfield, Mass. He was New England district manager.

Rodgers G. Wheaton was named president, **Line Material Co.**, Milwaukee, to succeed **William D. Kyle Jr.** who resigned to form a new company. Mr. Wheaton was vice president.

William M. Haile was elected a vice president of **Linde Air Products Co.**, division of Union Carbide & Carbon Corp., New York. He was manager, eastern division.

E. W. Krueger, president of **Worden-Allen Co.**, Milwaukee, fills the new post of chairman of the board and continues as treasurer. **E. J. Tiefenthaler**, formerly executive vice president and secretary, was elected president. **P. D. Krueger** was made secretary.

Montgomery Mason was elected vice president-general sales manager, **Locke Steel Co.**, Bridgeport, Conn. He succeeds **Sylvanus D. Locke**, retired.

Richard C. Bannon, vice president and director of **Waterbury Farrel Foundry & Machine Co.**, Waterbury, Conn., was made vice president-sales. He has been Cleveland district sales manager since 1941 and was elected vice president in 1954. His added duties became effective Jan. 1.

William C. Etheredge was made director of the price division, **United States Steel Corp.**, Pittsburgh. **Albert A. Monnett** was made assistant director, distribution and availability division; **Allan S. Oram**, assistant director, commercial research division; and **John D. Howe**, assistant director, price division.

James G. Tuthill was made president of **Tuthill Pump Co.**, Chicago. He succeeds **H. T. Kessler**, retired.

Beauford E. Gavin succeeds **W. W. Flagle**, retired, as manager of **National Malleable & Steel Castings Co.'s** Indianapolis plant.

B. Maloney, mechanical engineer, Hammond, Ind., division, **American Steel Foundries**, was appointed product engineering manager, with headquarters at the Hammond plant. **R. O. Tibbals** was made works manager, Granite City, Ill., Works to replace **C. H. Walcher** who transferred to the staff of vice president-manufactur-

WILLIAM G. STEWART

W. J. LONG

WALTER E. BAKER

. . . Universal-Cyclops management positions

ing, transportation equipment division, as consultant.

R. K. Grobholz was made manager of **Worthington Corp.'s** power pump sales division, with headquarters at Oil City, Pa., Works. He succeeds **A. F. Welsh**, now manager of the marketing research division.

William A. Stevens was made sales manager, **Union Steam Pump Co.**, Battle Creek, Mich.

Walter Rivers was made general manager of sales, metal container division, **Southern States Iron Roofing Co.**, Savannah, Ga.

Bell & Gossett Co., Morton Grove, Ill., appointed **Lee Wilson** manager of its air compressor division.

Lodge & Shipley Co., Cincinnati, promoted **Arthur V. Baumann Jr.** to sales promotion manager. He was advertising and sales promotion manager at the Hamilton, O., plant.

Arthur E. Russert was made assistant general sales manager, strip steel division, **Acme Steel Co.**, Chicago. He was Wisconsin district sales manager for the division.

Eugene F. Erbin was made metallurgical sales engineer of **Titanium Metals Corp. of America**, New York. He will be concerned mainly with market and product development.

William G. Stewart succeeds **Edward L. Stockdale** as president and chief executive officer of **Universal-Cyclops Steel Corp.**, Bridgeville, Pa. Mr. Stockdale becomes chairman of the board and will serve as consultant. **W. J. Long** was named vice president-sales and a director and **Walter E. Baker** was named vice president-operations. Other appointments: **W. L. Forgie**, senior vice president; **Carles T. Evans Jr.**, vice president-technology and development; **J. Thomas Rimer Jr.**, vice president; and **S. J. Hug**, secretary-treasurer. **Frank Garratt** and **U. Grant Miller** retired as vice presidents but remain directors and will serve as senior consultants to management. **John O. Rinek** becomes advisory vice president, retaining an active role in the sales organization.

Gerity - Michigan Corp., Adrian, Mich., elected **Walter C. Lok**, formerly executive vice president, to vice chairman of the board. **James J. Murtagh** was made executive vice president in addition to duties as general manager.

F. W. Neville was made purchasing manager of **C. O. Bartlett & Snow Co.**, Cleveland. He succeeds **C. Ralph Willson**, retired. Mr. Neville has been production manager since 1952.

Wilbert A. Walker was elected comptroller of **United States Steel Corp.**, New York, to succeed **Robert C. Tyson**, who continues as vice chairman of the finance committee. **L. C. Simmons** succeeds Mr. Walker as vice president-accounting and is replaced as comptroller of the National Tube Division by **H. T. Blake**. Mr. Walker continues as a vice president.

K-G Equipment Co., division of Air Products Inc., elected **Karl H. Schmuldt** vice president-sales, with headquarters at Allentown, Pa.

J. M. Frank was elected chairman of **Ilg Electric Ventilating Co.**, Chicago, to succeed **S. W. Weis**, who remains as honorary chairman. **W. H. Rietz** was elected president and treasurer; **J. J. Friedler Jr.** executive vice president and **W. T. Barry**, secretary-controller. **C. W. Dexter, S. E. Heyerick, R. E. Parker** and **C. F. Rietz** were elected vice presidents.

D. J. Stoker was made manager, North Pacific Division, **Armco Drainage & Metal Products Inc.**, Portland, Oreg. He succeeds **E. W. Gibson**, retired. **Marvyn R. Ambuhl** replaces Mr. Stoker as division sales manager.

Dr. John D. Kleis was made manager, electrical contact division, **Fansteel Metallurgical Corp.**, North Chicago, Ill. **Floyd M. Cessna** was made sales manager.

J. S. Johnson, founder of Holly Mfg. Co., Pasadena, Calif., which recently merged with **Siegler Corp.**, Chicago and Long Beach,

SUPERIOR TUBING acts as a temperature and mechanical handling shield for delicate sub-surface, radioactive logging instruments.

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W. L. KILLEN
. . . Downingtown Iron works mgr.

RICHARD H. EWERT
. . . Foote Bros. mgr.-gearing sales

MARTIN C. BUTTERS
. . . Butterfield Div. general mgr.

Calif., was elected vice president of Siegler, continuing as president of Holly Mfg. Co. Division.

W. L. Killen was named works manager of the fabricating plants of **Downingtown Iron Works Inc.**, Downingtown, Pa. **William F. Keehn** was made manager of product development. The firm is operated as a division of Pressed Steel Tank Co. Mr. Killen was general manager of Chicago Steel Tank Co.

Robert L. Smith succeeds **John M. Sullivan**, retired, as Chicago district sales manager, **Wheeling Steel Corp.**

Allan A. Watson was made manager - assemblies and components sales for **General Electric Co.'s** distribution assemblies department, Plainville, Conn.

Richard H. Ewert fills the new position of manager of gearing sales at **Foote Bros. Gear & Machine Corp.**, Chicago.

N. F. Eichelsbacher was made vice president - manufacturing, **Trion Inc.**, Pittsburgh. He is succeeded as treasurer by **William W. Nuernberg.**

George B. Troup, general manager, **Lubri-Case Inc.**, New York, was elected a vice president.

Howard F. Carver and **Lawrence C. Gleason** were elected vice presidents of **Gleason Works**, Rochester, N. Y.

Walter A. Hensel was elected vice president, **General Aniline & Film Corp.** He continues as general manager of the Ozalid Division at Johnson City, N. Y.

Martin C. Butters was appointed general manager, Butterfield Division, **Union Twist Drill Co.**, Athol, Mass. He succeeds **Stanley L. Holland**, who was elected president of Union Twist Drill. Mr. Butters, who joined the firm in 1950, has been employed in various engineering and managerial capacities.

Arnold J. Herrman was elected executive vice president and secretary of **American Cast Iron Pipe Co.**, Birmingham.

John B. Guba was made assistant sales manager, Detroit district office, **United States Steel Corp.**

Edwin A. Regan was made New York district sales manager of **Republic Steel Corp.** to succeed **William H. Oliver**, retired.

OBITUARIES . . .

Donald V. Sawhill, 54, chairman and president, **Tubular Products Inc.**, Sharon, Pa., died Dec. 24.

William G. Caird, 66, vice president-sales, **Denman & Davis**, North Bergen, N. J., died Dec. 25.

Henry H. Yerk, eastern sales manager for Niles machine tools, products of **Baldwin - Lima - Hamilton Corp.**, Hamilton, O., died Dec. 23.

Harold V. Porter, 60, general superintendent, **Chicago Gear & Mfg. Co.**, Chicago, died Dec. 23.

Theodore Trecker, 87, a founder and honorary chairman of **Kearney & Trecker Corp.**, Milwaukee, died Dec. 21.

Howard T. Hallowell Sr., 78, chairman of the board and a founder of **Standard Pressed Steel Co.**, Jenkintown, Pa., died Dec. 25.

Murray Earle, 63, president, **Earle Gear & Machine Co.**, Philadelphia, died Dec. 18.

John C. Jones, 51, vice president of **Aluminum Transatlantic Inc.** and president of **Magnesium Elektron Inc.**, New York, died Dec. 26.

Sir James Dunn, 81, chairman and president, **Algoma Steel Corp.**, Sault Ste. Marie, Ont., Canada, died Jan. 1.

Ben F. Hopkins, 79, retired chairman of **Clevite Corp.** and president of Cleveland Graphite Bronze Co., Cleveland, died Dec. 26.

Edward D. Youmans, 58, vice president-research and product development, **Okonite Co.**, Passaic, N. J., died Dec. 18.

Herbert A. Davis, president, **Fremont Casting Co.**, Worcester, Mass., died Dec. 28.

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GE Broadens Foundry Research Program

Dr. J. Keverian is appointed manager of applied research and development to head a new, $750,000 laboratory. Aim is to improve quality and lower costs of castings

AN APPLIED research and development laboratory to improve foundry processes and products will be established at Schenectady, N. Y., by General Electric Co.'s foundry department. It will cost about $750,000, says E. R. Oeschger, general manager.

The facility will have a foundry and areas for these laboratories: Physical testing, metallography, radiography and ceramics. The 17 engineers and technicians on the staff will serve operations at Everett and Lynn, Mass., Elmira, N. Y., Erie, Pa., and Schenectady.

The laboratory will occupy some 22,000 sq ft of space in building No. 93.

Appointment — A. E. Blake, foundry department manager of engineering, appointed Dr. Jack Keverian as manager of applied research and development to head the new laboratory.

"Due to increasing demands for improved quality and lower costs, it will be necessary to support a continuous and intensive study of the processes and materials used in our foundries," Mr. Oeschger said. He pointed out that major improvements in steam turbines, gas turbines, jet engines and other products have created demands for castings which are reaching beyond the ability of the industry to produce.

"In the case of steam turbines," he said, "the steady advance of temperatures and pressures has brought about growing need for higher quality castings which will withstand more severe standards of nondestructive testing. To provide castings of the highest quality and reduce casting cost, we must intensify our studies of the foundry process."

The need will best be met, he continued, through activities such as the applied research and development laboratory where the continuing critical technical problems can be intensively studied. Knowledge of basic foundry processes can be gained. And pilot plant work can be carried out without interfering with production.

Metallurgical research for the entire company will be carried out at GE's recently dedicated metallurgical laboratory in Schenectady.

Chemical Firm Expands

Heresite & Chemical Co., Manitowoc, Wis., built an addition to its plant. It will be used to expand the facilities for the manufacturing and application of baked phenolic coatings and synthetic rubber.

Goodyear Buys Illinois Plant

Goodyear Tire & Rubber Co., Akron, purchased a plant on the Skokie highway, between Waukegan and North Chicago, Ill. The property will provide additional facilities for the manufacture of industrial rubber products. This is part of Goodyear's two-year expansion program which will cost about $100 million.

Lets Open-Hearth Contract

Loftus Engineering Corp., Pittsburgh, will handle engineering work in the construction of what is claimed to be the largest open-hearth furnace ever built. This open hearth, ordered by Weirton Steel Co., division of National Steel Corp., for its Weirton, W. Va., plant, will produce 600 tons of steel in one heat. This is one of the first contracts placed under National Steel's recently announced $200-million expansion program which will add 1 million tons to its steel capacity in 3½-years.

Tracto-Lift Co. Changes Hands

L. A. Young Spring & Wire Corp.'s Ottawa Steel Division, Ottawa, Kans., purchased Tracto-Lift Co., Kansas City, Mo., whose principal product is a heavy-duty fork lift truck. It's designed for outdoor movement of bulky materials over rough terrain. It will be manufactured in Ottawa's home plant, supplementing a line which includes hydraulically operated, tractor-loader equipment and other types of hydraulic construction machinery.

Fabricator Changes Name

Cincinnati Copper Works Inc., Cincinnati, fabricator of equipment for breweries, distilleries and related industries, changed its corporate name to Central Fabricators Inc.

Misco To Build Third Plant

Misco Precision Casting Co., Whitehall, Mich., is building a plant in Muskegon, Mich., for the production of investment castings. Theodore Operhall, president, announced that the growing need for investment castings in the aircraft

THEODORE OPERHALL
. . . Misco Precision Casting president

industry indicated that additional capacity will be required by Misco. The new plant, containing 85,000 sq ft of office and manufacturing space, will be under the direction of Donald Harpold, plant manager, and Ajax Vartanian, plant superintendent.

Misco has specialized in the production of blade and vane turbine elements for gas turbine applications. Currently, the company is participating in many of the major jet engine programs. Misco also produces components for locomotive gas turbines and stationary

power plants which require investment cast turbine blading.

The future of investment castings is greatly contingent on the turbine era. The apparent trend of gas turbine applications to many fields has justified the expansion needs at Misco, officials say.

Canton Stoker Buys Pump Firm

Canton Stoker Corp., Canton, O., purchased Wagener Steam Pump Co., that city, maker of piston-type steam and power pumps. Manufacture of the pumps will be carried on under the name of Wagener-Schrader Pump Division of Canton Stoker Corp.

Connors Expansion Progresses

H. K. Porter Company Inc.'s Connors Steel Division, Birmingham, expects to complete a $2.5-million expansion program early in 1956, including the manufacture of cold-drawn steel. D. J. Gent has joined the sales department. He will handle cold-finished bars.

Siegler Buys Holly Mfg. Co.

Siegler Corp., Chicago, acquired Holly Mfg. Co., Pasadena, Calif. Siegler makes space heating equipment, closed-circuit television and other electronic equipment. Holly makes walltype heaters and central heating equipment.

Heppenstall To Buy Midvale

Heppenstall Co., Pittsburgh, purchased the physical assets of Midvale Co., Philadelphia.

Heppenstall's steelmaking capacity will jump from its former 60,000 tons to 300,000 tons annually. Both firms are manufacturers of steel forgings. To operate the plant, Heppenstall will set up a subsidiary, Midvale-Heppenstall Co.

In addition to Heppenstall Co., Allis-Chalmers Mfg. Co., General Electric Co. and Westinghouse Electric Corp. will participate in the financing of the transaction. The electrical companies will invest in nonvoting preferred stock, while Heppenstall will own all the common stock.

The new owners plan to spend about $2.5 million in renovating the Midvale plant.

Woos Foreign Trade

Cleveland Twist Drill is planning to build in Scotland to recapture its business abroad

PETERHEAD, a small fishing village on the coast of Scotland, is about to get its first taste of American industry. Early in 1957 a new plant there will begin to turn out high-speed steel twist drills.

The plant will be operated by Cleveland Twist Drill Co., Cleveland, and will employ 120 initially. The building will be built by Scottish Industrial Estates, a quasi-governmental corporation, and will be leased from them by Cleveland.

More Lines—L. S. Barrus, assistant to the president, will take over operations in Scotland as managing director. In addition to straight and taper twist drills, the plant also will make hardened and ground tool bits. As both operations and markets develop, additional lines will be considered.

Recapture of a fine prewar foreign market is the goal. Mr. Barrus feels that a combination of the dollar shortage and the price problem has caused the company's export market to dwindle at a time when it should be expanding to take care of growing industrialization abroad.

Labor—Fishing and supporting industries have been Peterhead's mainstay since about 500 A.D. Now, with a tapering off of the town's income from fishing, there is a surplus of labor, which Mr. Barrus feels is high grade. The new plant will take advantage of the surplus.

Allied Mfg. To Move

Allied Mfg. Co. Inc., Worcester, Mass., purchased a manufacturing building at 50 Millbrook St., that city. The firm will move to that location "before Feb. 1." Allied Mfg. makes carbide dies for the machine tool industry.

GM Unit To Build Plant

General Motors Corp.'s AC Spark Plug Division, Flint, Mich., will build a 75,000-sq-ft plant in Oak Creek township, near Milwaukee. The plant is the first of several buildings to be built on this site for AC's expanding electronics and defense manufacturing work. Construction is scheduled to begin early in 1956, with occupancy expected in 1957. The division will continue to operate its three other Milwaukee plants.

ANNIVERSARIES

Bucyrus-Erie Co., South Milwaukee, Wis., celebrated its 75th anniversary last month. The firm produces power shovels, cranes and drilling equipment. The company was organized in Bucyrus, O.

ASSOCIATIONS

Philip J. Faherty was elected president of the **Cast Iron Soil Pipe Institute.** He is vice president of Buffalo Pipe & Foundry Corp., Buffalo. J. H. King III of T. C. King Pipe & Foundry Co., Anniston, Ala., is vice president; D. W. Hallman, Hajoca Corp., Quakertown, Pa., treasurer; and H. E. Robertson, executive vice president, with headquarters in Washington.

Gordon S. Culver, president, Richards-Wilcox Mfg. Co., Aurora, Ill., was elected president of the **Illinois Manufacturers' Association.** Other officers are: C. S. Craigmile, Belden Mfg. Co., Chicago, first vice president; J. L. Dole, Dole Valve Co., Chicago, second vice president; and L. C. Ferguson, Western Newell Mfg. Co., Freeport, Ill., treasurer.

NEW ADDRESSES

Speedi-Dri Corp., a subsidiary of Minerals & Chemicals Corp. of America, moved its offices to the new general office and minerals research center of its parent company at Menlo Park, N. J.

New York representatives of **Jack & Heintz Inc.**, Cleveland, moved to 390 Plandome Rd., Manhasset, N. Y. Jack & Heintz is a manufacturer of electrical accessory equipment for aircraft and missile projects.

Yes Sir, that's my baby!

WHEELABRATOR'S Newest abrasive development

STEELETTS®

for maximum economy in grit blasting

Just born . . . Steeletts . . . a high hardness grit with the life of steel. Free from the brittle carbides that cause rapid breakdown of chilled iron abrasives, each particle of Steeletts has a longer, more productive working life span than any other grit. This means maximum economy.

Steeletts do not chip away on each impact but retain their size and shape longer than any other grit, thereby increasing the impact power of each pellet while lengthening the life of the abrasive. This adds up to maximum economy.

Steeletts are in the same hardness range as chilled iron. This hardness pinpoints the impact of the blast, resulting in speedy removal of even the hardest alloy steel scale and fast and deep etching of the hardest surface. This, too, contributes to maximum economy.

Steeletts retain their basic grit shape when used but the sharp edges become dulled. The grit shape imparts the matte finish essential for grit-blasted surfaces but the dull edges minimize the problem of embedment and reduce the wear and maintenance problems caused by the sharp fracturing edges of other grits. This, too, adds up to maximum economy.

For more information on Steeletts, send today for your copy of Bulletin 901-D. It's filled with valuable information on this new, long-life, high-speed, low-cost abrasive development.

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(Formerly American Wheelabrator & Equipment Corp.)

World's Largest Builders of Airless Blast Equipment and Steel Abrasives

509 S. Byrkit Street, Mishawaka, Indiana

STEEL

January 9, 1956

Technical Outlook

TITANIUM'S MOVING—Titanium producers will be called on to more than double the output of mill products in 1956, says T. W. Lippert, manager of sales and technical service, Titanium Metals Corp. of America. Bars, billets, sheet, strip, wire and extrusions turned out last year are estimated at 1900 tons—46 per cent above 1954's record 1300 tons. The government sets 1956 needs at 4000 to 4500 tons. Mr. Lippert says the uniformity of chemical and physical properties of titanium is better than that of a lot of older structural metals.

PINCHED EARS—Know those little ears or cups where the handle hooks on to a paint can? American Can Co. is spinning them into recesses stamped in the can. It makes a solderless joint.

TUNGSTEN STUDY—The Tungsten Institute has signed a contract with Stanford Research Institute to develop new, high-temperature alloys aimed at the "ultimate" jet blade material. "Tungsten is in ample supply in this country," says W. Lunsford Long, president of the Tungsten Institute. False publicity on its shortage has discouraged development work on new alloys, he reports. In 1954, domestic production outstripped consumption about three times.

LEAD COVER—Knapp Mills Inc. is lead cladding steel sheet with an automatic machine developed by American Viscose Corp. Atomic energy applications are creating a brisk market for the product.

ROOM FOR GROWTH—When engineers at GE's motor and generator department in Schenectady, N. Y., bought a new lathe, they made sure it was big. It's bigger than needed for any job now under way, but it is built to anticipate a demand for the larger generators, motors and flywheels to come. The lathe, built by Consolidated Machine Tool Corp., has a 144-in. swing, is 55 ft between centers. Centers alone will carry a 200-ton load.

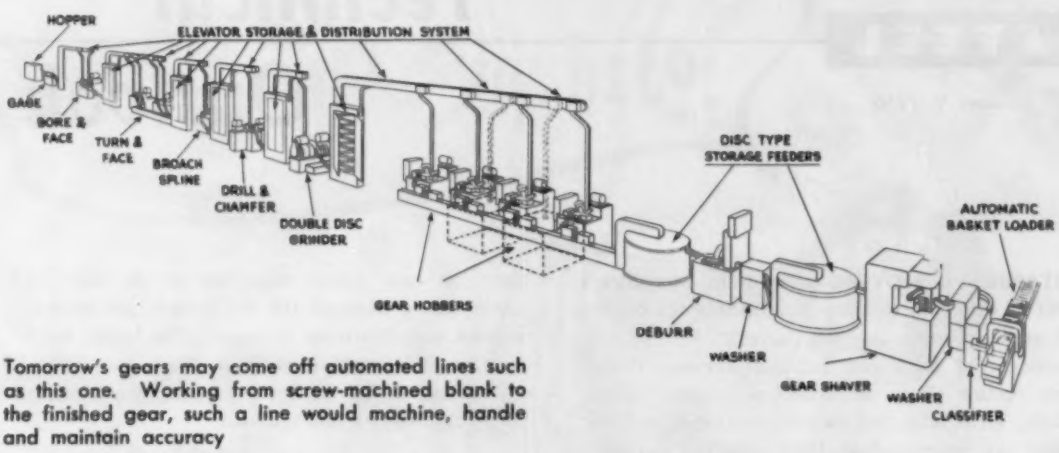
PEER IN—A water cooled periscope is being used by British steelmakers to inspect linings of open hearths. One model, a 6 ft tube of narrow bore, can be inserted through a hole at any point in the furnace walls. The head protrudes some 4 in. inside, and is fitted with three small apertures which can be rotated to give a full view of the roof or interior.

TRANSISTORY—Hot from Westinghouse research: A transistor capable of efficient operation at television-level frequencies, and a photodiode transistor which is 10,000 times more sensitive to light than a conventional photoelectric cell and can handle 100 times more current. The key is a manufacturing method where temperature control is unimportant.

PEEP SIGHT—A redesigned detector will spot pinholes 1 mil in diameter in steel strip 10 mils or less thick traveling at 2000 fpm. GE predicts 6000-fpm spotting for the device. It replaces a detector that could see 5-mil holes.

HYDROGEN HURRY-UP—At the Sanderson-Halcomb works of Crucible Steel a man holding a magnet maneuvers pellets of metal through a maze of glassware in a Ferrovac (magnetic, low-hydrogen) boat. He's making quantitative hydrogen determinations in minutes instead of hours, vital in titanium melting. National Research Corp. made the apparatus.

Metalworking Outlook—p. 21 *Market Outlook—p. 89*



Tomorrow's gears may come off automated lines such as this one. Working from screw-machined blank to the finished gear, such a line would machine, handle and maintain accuracy

Automated Gear Production

Rigidity of machines, handling and inspection equipment must be spotlighted for future development. So must cutting tools and warning signals

THE INTEGRATED production line above is a self-contained system for producing finished gears from screw machine blanks. It may be a picture of tomorrow's automation for gears.

In this line, handling equipment distributes the parts to the machine tools on a demand schedule and stores them between operations. Each machine loads automatically and is automatically corrected to maintain correct part size.

Independence—When M. R. Anderson, executive vice president, Michigan Tool Co., Detroit, revealed this scheme at an ASME meeting, he pointed out it needs no interlocks between the machines and the handling system. Each unit can operate at its optimum rate without being dependent on the balance of the line.

Parts are fed directly and evenly to machine tools without being delayed in dead storage. Excess parts are stored automatically on a first-in, first-out basis. There's no reason, he says, why heat treat couldn't be integrated in the line.

Giant — Another line is being built by Michigan Tool for "one of the major automobile companies." This one is 1200 ft long. It will turn out about 800 pinions an hour.

Blanks are ground, bored, faced and chamfered. Sixteen hobbers and four shaving machines cut the teeth. They're loaded in baskets for heat treat, and then are chamfered, ground, honed, washed and inspected—all automatically.

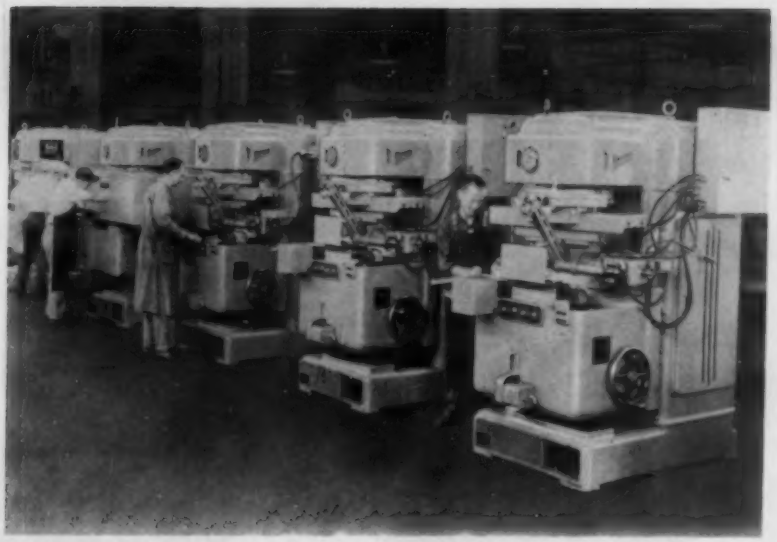
More Muscles — Although present machines are heavier than their predecessors, Mr. Anderson believes future machines will be designed for still greater rigidity. This can be attributed to increasing demands for accuracy, coupled with the requirement that machines be able to operate at peak capacity practically 24 hours a day.

Rigidity is one of four points he thinks will have to receive more attention. The second is tool life which appears to be one of the limiting factors in automation.

Third, Mr. Anderson cautions that we have not come far enough in the development of warning signals. Improved systems, both electronic and optical, must be incorporated into future equipment. "We probably will find ourselves using more tape controls for repetitive operations. Possibly, we will be using a punch card system."

Fourth, he says experience shows the desirability for more rigid design of chutes, as well as of the inspection equipment.

Customized—Today's gear automation is built primarily on the principle of having more or less standard machines customized with



Simple automation, chute loading, is being installed on four of these five gear shaving machines. Coincidentally, this is about the same proportion as ordered by industry in the last 18 months

automatic loading devices and controls so a single product can be machined.

The machines are grouped through a series of conveyors. All conveyors are connected to a series of limit switches and electric eyes that control releasing of parts from loading chutes and hoppers. Switches are connected to central control panels where the timing can be controlled when the loader on a particular machine calls for more parts.

On Demand — Each producing unit, consisting of machine, checker, control and a washer, should operate as close as possible to its maximum fixed rate.

Mr. Anderson's answer to correlating supply from machines with different cycle times: A vertical zig-zag conveyor that functions as a storage cabinet. It will continue to operate, and to deliver gears, even when it isn't full of parts. In fact, one gear could travel the complete line without holdup.

Gears stored in the cabinets are delivered only when they're required by the next operation.

Checkers — Gears on the line have to be checked for size, helix angle and runout. Roots of the teeth are probed to be sure parts don't come through with teeth deformed.

Automatic checkers "feel" gears as they come off the machine, stop it when gears are defective. So each machine operates as a self-contained unit.

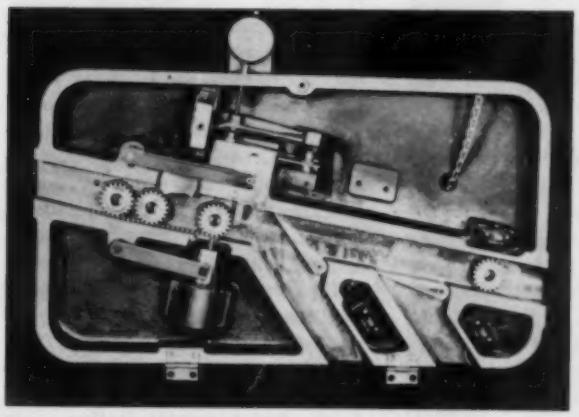
Controllers — Other checkers (classifiers) sort parts into good, salvageable or scrap bins. As gears go through the classifier, signals are sent to the machine to adjust it so gears continue to come within tolerances.

The machine adjustment is usually made on the second bad gear coming through. Adjustment can be initiated, Mr. Anderson points out, by the second, third, fourth or fifth consecutive off-limits part. It also can be automatically initiated if rejects should exceed a predetermined percentage of parts being produced.

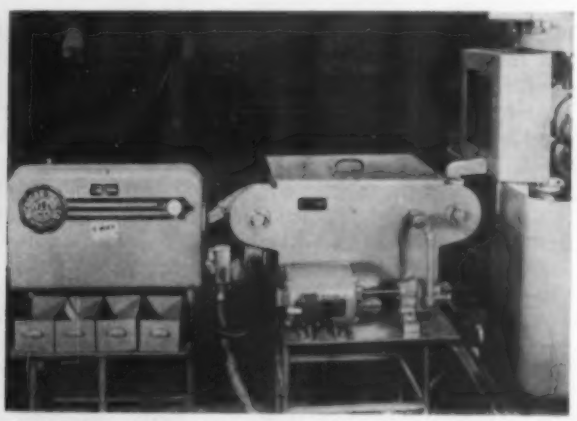
The nature and extent of the adjustment and its signal depend on how precisely the gear needs to be machined. Dials on the classifier also can be preset to make adjustments for tool wear or temperature changes.

End Result — What will this automated gear production mean? Mr. Anderson cites two results that seem sure to come. Standards not only for equipment but for the gears themselves may be rewritten. For example, Michigan Tool Co. engineers are preparing new standards for rolled splines and serrations, based on the performance of their Roto-Flo machines.

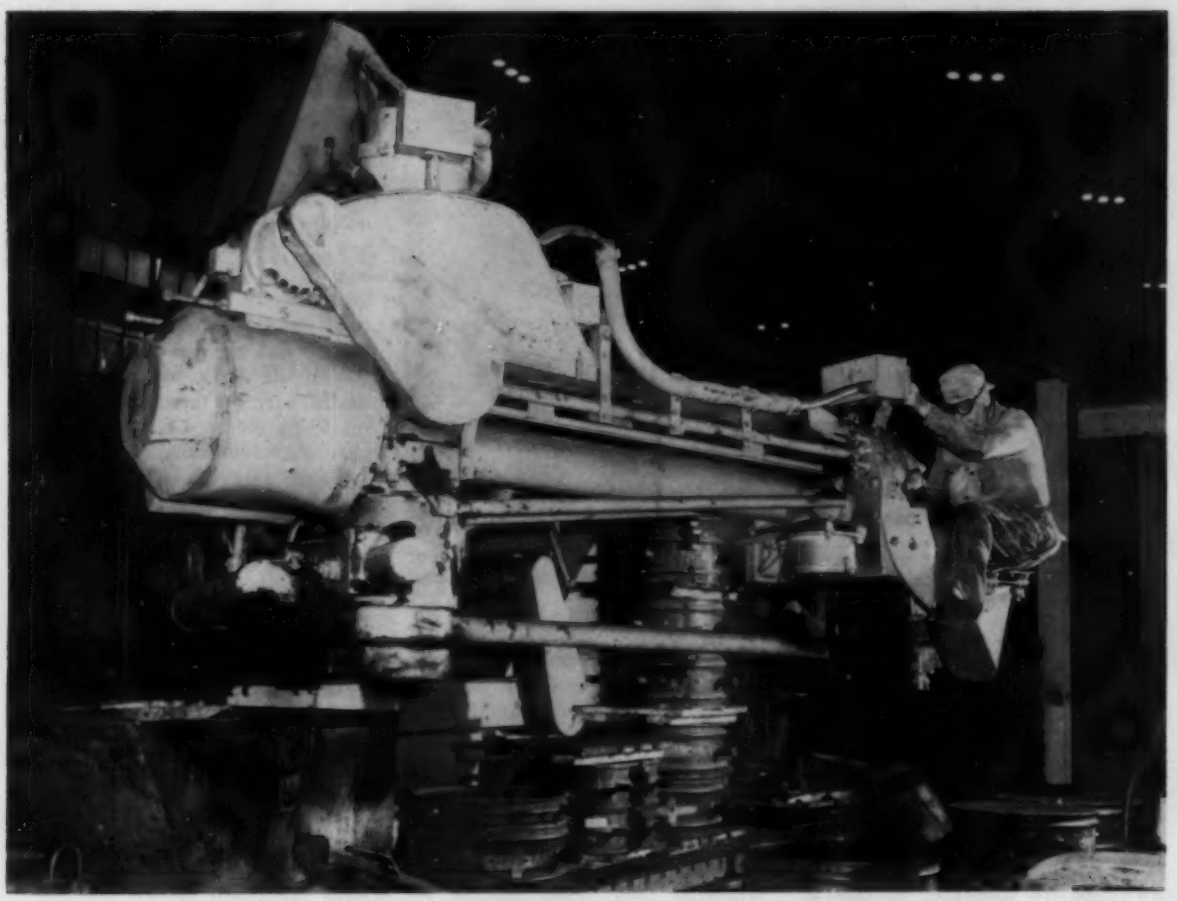
Second, changes wrought by automation will affect most gear producers, including those who can't use automated methods. As gear production techniques improve, "we may find we can take advantage of much closer tolerances than we have in the past."



Exposed view shows how gears are probed in a classifier. O.K. gears go on through, others are sorted into two bins—one for scrap, the other for those that can be salvaged



Automatic gear washer removes chips from gears as they are shaved, then passes them to a classifier at left, where they are checked for size and helix



Sand slinger, for smaller castings, runs on a narrow-gage track

GE Remolds a Foundry

INCREASED MECHANIZATION, the first step toward automation of General Electric Co.'s No. 2 Foundry at Elmira, N. Y., is solving the problem of how to produce small lots of castings—economically.

Results to date: During the first nine months of operation, sales (98 per cent go to GE divisions) have increased by some $200,000 over the corresponding period in 1954. Employment has jumped 11 per cent.

Point of interest: While production is rising, there has been no need to expand the foundry building. By mechanizing, GE has enabled each shift to: 1. Make molds. 2. Pour. 3. Shakeout. Previously, the first shift could only produce molds and pour. The second shift did all of the shakeout work. Now, three shifts could be used, if necessary, with each shift completing the entire cycle.

Wide Range — Castings being produced include motor and generator end shields, stator frames, bearing pedestals and miscellaneous turbine - generator castings. Over 80 per cent of the castings go to the product departments of GE's Apparatus Group.

Two systems for speeding movement and conserving floor space are in operation. A 10,000-lb, roll-over pattern draw machine produces castings up to 3000 lb in molds up to 72 in. A 1500-lb, roll-over unit is used in molds up to 35 in. Other new equipment includes roller conveyors, a power indexing turntable 20 ft in diameter and a remotely controlled stationary sand slinger.

Big Ones—The larger castings go through this cycle:

1. A pattern is removed from the storage area, placed on a system of roller conveyors and moved to the first turntable station.

2. A 1-ton bridge crane places a flask over the pattern; gaggers are

set; and facing sand is applied.

3. The table is rotated to the second position where the remotely controlled stationary sand slinger rams sand into the mold at a rate of 1 ton a minute.

4. The mold is indexed to the third station for strike-off.

5. The roll-over machine inverts the mold and draws it down from the pattern. Under the old system, the pattern was drawn up from the flask with a crane. As the crane operator had to deal in three dimensions, there was a high rate of mold damage. GE estimates that savings on pattern repair alone will amount to some $10,000 this year.

6. The pattern is returned on a system of conveyors to the storage area or may be indexed to return to station one for re-use.

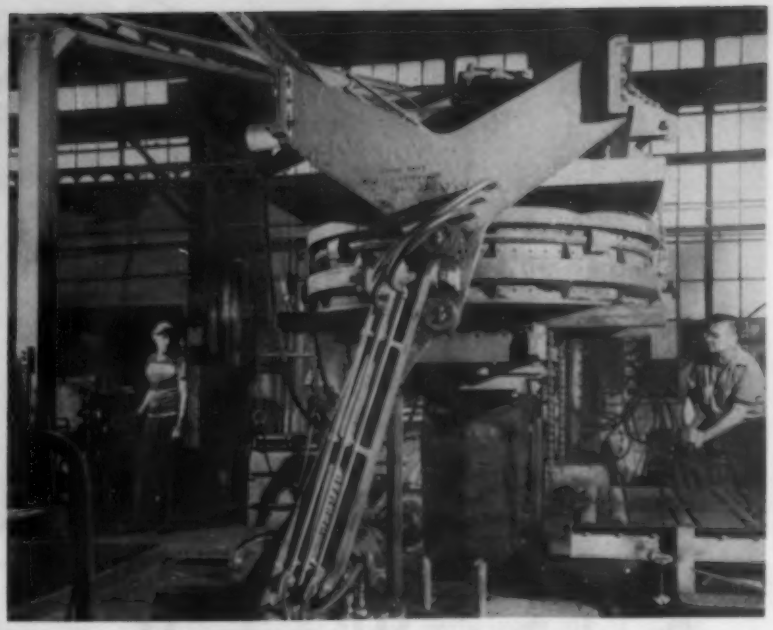
7. The complete mold is moved by crane to the floor where cores, if needed, are inserted and the mold closed. It is then ready for pouring.

Second Method—Production of smaller castings is similar. The flask is placed over the pattern by a crane while it is on the roller conveyor. Then pattern and flask are moved to a jolt machine where facing sand is applied. The sand-slinger, which rams the mold with sand, is on a narrow-gage track parallel to the roller conveyor.

After strike-off, the molds move to the 1500-lb, roll-over machine. Patterns move on the roller conveyor back to the storage area or to a point of re-use. The halves of the mold are finished, cores placed and the mold closed by bridge cranes. The mold is rolled onto another spur of the roller conveyor where it is poured. A conveyor carries the poured mold to a point where it is lifted by a jib crane to shakeout.

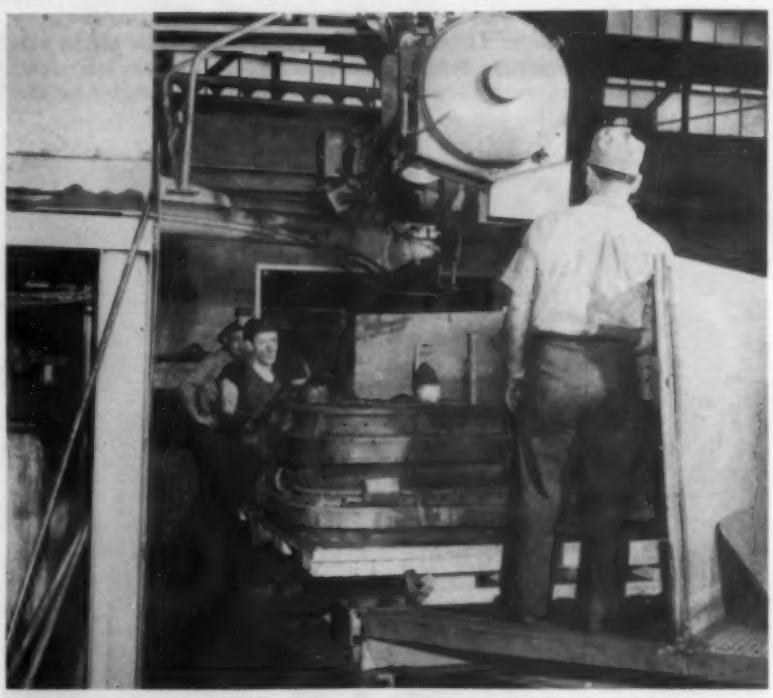
Both systems have proved to be economical for either long or short production runs.

Advantages—The use of roller conveyors, some 350 ft for the smaller casting operation and 160 for the larger, eliminates much of the extensive crane operation formerly needed. It also discontinues the manual jobs of attaching slings and removing them. The hand job of freeing the pattern in the mold is also a thing of the past. Peak daily production for the larger castings was 63. Now the same number of men can produce 120 castings a day.



The roll-over machine inverts the mold and draws it down from the pattern. The pattern is returned for re-use by roller conveyors

Crux: The semiautomatic operations being used are introducing the basic principles of automation in GE's production of castings up to 3000 lbs.



For larger castings, the indexing table rotates into position and the remotely controlled stationary sand slinger rams sand into the mold

Feeding wire from the carrier. Reel revolves on heavy base

Fork truck picks up two carriers at a time

Reel Puts Wire in Heavyweight Class

Here's an all-in-one shipping carrier and feeding reel that offers economies with heavy wire coils. It revolves on a base you can make from a truck front axle

IF YOU'RE a volume wire user, expect to get your wire in 2000 to 3000-lb coils on carriers before long.

In operations requiring long machine runs, the savings will be substantial: There'll be less down time on the equipment for loading and threading. You'll have fewer scrap ends—an important factor in the heavier gages. You'll gain labor savings because one man will be able to operate more machines.

Space-saving storage. Wire-filled carriers stack two high

Supplier — Continental Steel Corp., Kokomo, Ind., is introducing a new wire carrier for coils (2000 lb and up) of low and medium carbon bright industrial wire (14 gage through ½-in.). The carrier (see pictures) is constructed of a steel plate base and pipe frame reel to hold the wire. The reel revolves on the base.

Continental made a comparison test between 2000-lb coils of ⅜-in. wire on the carrier and conventional 220-lb coils. On straightening machines, efficiency went up 66 2/3-per cent with the larger coils. With the smaller coils, scrap loss was six times greater than that of the larger coils. Quality improved because the operator spent less time loading the machines and more time watching the wire straightening operation.

Easy returnability. Four empty carriers can be nested

Important in the development of the carrier are improvements in wire drawing techniques which permit 2000 lb and more to be drawn continuously. Because of handling problems, wire has been provided in coils of 220 to 450 lb, although some draws had been made up to 900 lb.

Plan—Continental rents the carriers for $1. The customer deposits $40 for the carrier when the wire is shipped and gets a $39 credit when the carrier is returned. Shipping costs are paid by the customer.

Customers can buy carrier bases at cost ($250). Adequate bases can be built from the front axle assembly of a truck.

Prospects—Howard C. Williams, Continental vice president, predicts that 3000 to 4000-lb coils will be common in the near future. "We'll also be shipping galvanized wire on the carriers soon," he adds. Not recommended for the carriers are high-finish or dead-soft, tempered wires.

The company plans to put about 2000 carriers into service in the next few weeks, and when the program gets into full swing, it expects to have between 8000 and 10,000 of them in use.

MACHINE TOPICS

By R. F. HUBER, *Machine Tool Editor*

"LOOK before you leap into the drive to higher horsepower."

The warning comes not from Detroit carmakers, but from machine tool builders who think there's a danger the ballyhoo about spectacular horsepower may mislead some users.

Widespread — Across the board, machine tool horsepowers are up. B. N. Brockman, vice president, R. K. LeBlond Machine Tool Co., Cincinnati, cites the 60 hp being installed on many 32-in. lathes. Even as recently as five years ago, the horsepower of 32-in. lathes averaged about half that.

This broad boost is due strictly to users' desire to get the metal off faster.

Off the Top—Above that, however, are the machines like LeBlond's 125-hp, 32-in. lathe at Carboloy Department, GE. These machines are spectacular, get widespread publicity and probably can be used only by a handful of companies in the whole country.

The only answer to horsepower is for the user to determine, before he buys, what his power requirements will be, and then allow some for tougher requirements in the future.

Chances are, builders feel, this approach to power for machine tools will keep demands within bounds—at the same time, users will avoid wasting money on unused power.

Going Up?

New orders for metalcutting machine tools hit $127.9 million in November. This follows October's $102.6 million, and shows a sharp upsweep for the end of 1955. The highest previous month was June, with $77.8 million.

Shipments also climbed during the year, from about $50 million in January to $63 million in the NMTBA's November report.

Who's Responsible?

How important is it to have production equipment and the integrated handling equipment built by the same company? Here's one phase of the automation business where there may be some sharp disagreement.

Some experts feel that the handling should be left to companies with experience in that field. C. S. Davis Jr., vice president, Lake Erie Engineering Corp., Buffalo, points out, however, that the centralization of responsibility should be an important one to the user.

If one builder makes both the machines and the handling, bugs in the system can be worked out in his plant before delivery. There's a minimum of trouble, he says, in co-ordinating performance of production equipment and the handling to and from it.

Rush Job—For the Louisiana Ordnance plant at Shreveport, La., Lake Erie built 22 presses. It also built all the handling equipment through these presses, the tooling and the die lubricating facilities. Orders were received in March, 1953; production began in October. Run-in time at the shell plant was negligible.

Electro Metallurgical Co.

Electric Furnacemen Talk Shop

STAINLESS was the center of interest when electric furnacemen got together in December.

The news: Meaty reports (some summarized below) on stainless and heat-resisting steel ingotmaking. The occasion: The annual meeting of the Electric Furnace Steel Committee of the AIME in Pittsburgh.

Ferrochromium — In stainless melting practice, there's no distinct advantage in using medium instead of high carbon ferrochromium where heats are not tapped and recharged, reported L. G. Cotton Jr., Duquesne Works, U. S. Steel Corp.

Chromium recoveries are lower with the ferrochromium charge than with the straight scrap charge. High melt carbon content associated with the carbon charged in the ferroalloys does not increase oxidizing time and does not adversely affect heat time. No increase in excessive refractory damage was noted with medium and high-carbon ferrochromium in the charge, although refractory consumption for fettling went up.

Chromium Recovery—For optimum recovery of chromium units, several factors are important, said D. J. Carney, superintendent of electric welding, U. S. Steel Corp., Chicago. 1. Attainment of the lowest slag volume and chromium content consistent with an economic scrap charge and carbon oxidation practice. 2. Use of a basic bottom with lime-silica ratio in the slag of about 1:5. 3. Intimate mixing of slag and metal consistent with slag fluidity and slag-metal mixing. 4. Use of a strong deoxidizer with a minimum dilution in iron.

Tests of stainless steel baths in an 80-ton arc furnace with a 20-ft-diameter shell and a bath depth in the center of about 30 in. have revealed a difference of as much as 4½-per cent chromium from top to bottom of the bath at the slag reduction stage of the heat.

Clean Heats—C. Yutmeyer, superintendent of electric furnaces, Crucible Steel Co., Midland, Pa., pointed out that clean heats can be made consistently if the bath temperature is maintained at a high level throughout the refining period.

Dirty heats occur when the bath is allowed to get too cold from large doses of final additions. The furnace is pounded hard to get the bath up to the correct tapping temperature, and this practice tends to give a stratified bath, hot slag and an abnormal spread in the temperature during teeming.

Technique for air and oxygen flushing drew several comments. Here's what three speakers had to say about it:

Hydrogen — L. F. Barnhardt, plant metallurgist, Atlas Steels Ltd., Welland, Ont.: Atlas practice for hydrogen control of a gas-sensitive steel in a 30-ton furnace involves six steps. Dry air is played over the entire slag surface during the refining period, providing the dew point of dry air supply is satisfactory. At the alloy tests, a 2-minute flushing of either dry air or argon is given with the lance moving over the entire furnace bottom.

When ready to tap, two split mold tests are cast at the furnace and examined closely after solidification. If hydrogen wildness is indicated, a 2-minute flush with dry air or argon is given, followed by two more split mold tests. This is continued until tests are no longer gassy.

After obtaining good tests, a 2-minute dry air flush is given immediately before tapping. The empty ladle is flushed out with dry air or argon; then dry air or argon is kept blowing around the stream during tapping. Finally, dry air or argon is flushed in the ladle after tapping for about 30 seconds. Under the foregoing practice, incidence of hydrogen-wild ingots and gassy etch tests, even during periods of high humidity, is extremely rare.

A. J. Texter, superintendent of melting department, Firth Sterling

GUNCHROME-M
Because of its chemical bonds, plasticizing agents, and carefully controlled sizing, Gunchrome-M adheres well to hot furnace walls and forms a dense, strong structure similar in composition to chrome-magnesite brick.
GUNC
URNACE MAINTENANCE
Designed for Gun Maintenance of Furnace Structures
SAVE TIME, SAVE MONEY, BALANCE FURNACE LIFE

Write for this new bulletin on

GUNCHROME-M...the chrome-magnesia refractory for quick, hot repair of critical furnace areas

●If you are concerned with furnace operation and maintenance, you'll want to know more about Gunchrome-M.

This unique chrome-magnesia refractory is applied by air emplacement to back walls, skewbacks, front walls, end walls, arches, uptakes, and other critical areas.

Not only is Gunchrome-M an easy effective method of repairing hot furnaces, but it insures:

1—balanced furnace life through maintenance of critical areas. 2—reduced brick replacement at rebuild by periodic maintenance throughout furnace campaign. 3—the ability to meet emergency needs for extending furnace life beyond normal campaign expectancy.

Ask your Basic Sales Engineer for facts and figures on Gunchrome-M as revealed in actual application reports. Or write for Gunchrome-M Bulletin G-101 illustrated above.

BASIC REFRACTORIES INCORPORATED 845 HANNA BLDG. CLEVELAND 15, OHIO

GRANULAR BASIC

REFRACTORIES

Inc., McKeesport, Pa.: A short oxygen blow of about 5 minutes at the end of the melt-in, before reduction of the slag is started, permits use of higher percentages of revert or grade scrap in the charge. Better and closer control of carbon, silicon, temperature and quality is maintained by the short oxygen blow at this stage.

At Firth Sterling, dried air is used for purging or flushing the bath to accomplish: 1. Mixing of the bath before the control tests are taken. 2. Elimination of dissolved gas, which would cause ingot bleeding or porosity in the finished bar. Air purging a bath of 15,000 lb will cool the steel about 10°F per minute of blowing; the bath temperature must be at least 2950°F at the start of the blow, for best results.

Prevent Pickup—H. M. Parker, open-hearth superintendent, Armco Steel Corp., Butler, Pa.: The hydrogen content of the bath must also be kept low to avoid excessive seams and blisters. Tests are taken prior to tap, and if the hydrogen content is too high, corrective measures are taken. In some shops, the excess hydrogen is flushed out with inert gases.

The best practice is to prevent hydrogen pickup by controlling water leaks of the equipment and to use only dry materials after the slag off. When oxygen has been used previously to reduce the bath carbon, there is less likelihood of hydrogen trouble.

Slag Treatment — The period from slag off to tap is the most important part of the heat cycle. The shorter the time from slag off to tap the better the quality.

Titanium and aluminum bearing grades require special slag treatment. For titanium grades, the slag is removed just prior to tap to reduce the volume, and a new slag of burned lime and shot aluminum is built up. The titanium may be added either in the furnace or in the ladle. Slag is also removed prior to tap for aluminum bearing grades and thoroughly deoxidized with aluminum shot. This helps to obtain more uniform recovery of the aluminum added in the ladle.

Compressed Air & Gas Institute

Air units like this four-spindle nutsetter do . . .

Fastening in a Hurry

FABRICATING large beams took three men three days when parts were bolted by hand. Air tools now do the job in 1 hour. If multispindle nutrunners were used, the output could be doubled.

Multiple tool units have long been used in the automotive industry. Other fields, such as housetrailers, air conditioners, radios, kitchen units and television, are finding savings through the versatile tools. Some companies have air tools which will run down 20 or 30 screws simultaneously.

Air Supply—In using multiple tool units, the air supply must be greater than that needed to guarantee successful operation. These tools operate at a lower than line pressure to assure constant pressure for each machine in the unit.

It is wise to choose machines that have more stalling torque than required. Tool life can be extended because air pressure can be increased as parts in the machine wear. This is the reason maximum torque is not listed on torque ratings of multiple nutsetters.

Built-in Protection — Multispindle machines seldom operate on more than 60 to 70 lb of air pressure. This prevents stressing them to the limits and allows their use on high production lines over long periods.

In many cases, the emphasis placed on spindle speed as a time saving factor is out of proportion to the possible time savings. Rundown time is but one of five or six factors involved in a fastening operation. If it were reduced to zero, it would result only in a fractional savings on the complete operation. A slower spindle speed with greater torque will often result in a greater working speed.

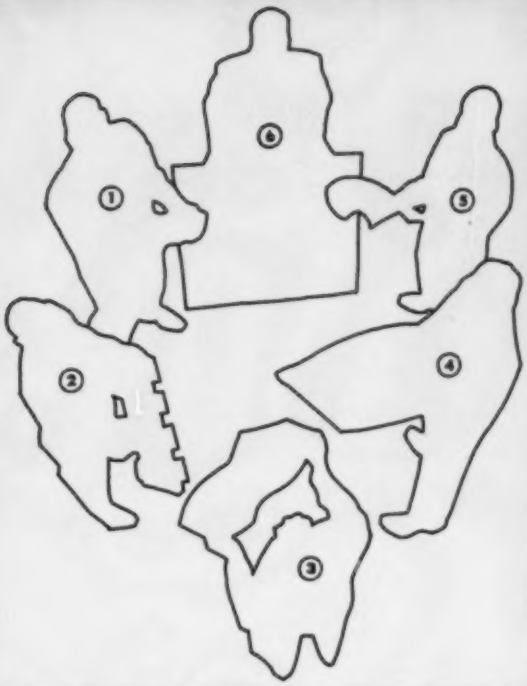
Maintenance—Operating a multiple tool setup with protecting features, such as mounted air gage, moisture separators and filter units in the air line, will keep maintenance costs down. The fact that the machines are never loaded to full capacity will reduce maintenance over individually operated units that are not protected and are hand torqued over their capacity to get results the machines were never built to produce.

GRUELING DEMOLITION CONTEST FAILS TO FLAKE TI-CO!

STOCK CAR DRIVER inspects sheet of Ti-Co after battering in demolition race. No trace of coating failure could be found.

The brutal "demolition race" is one of the top crowd-pleasers in stock car racing. Each driver is bent on smashing his opponents out of the race . . . last car still moving is the winner! This grueling automotive mayhem at Chicago's Soldier Field provided the setting for an unusual demonstration of the toughness of the zinc coating on Inland Ti-Co galvanized sheets. A sheet of Ti-Co was lashed to the rear of one of the doomed jalopies. Car after car rammed it head-on, at speeds up to 50 m.p.h. After half an hour of constant crashing, battering punishment, the car was finally ready for the junk heap . . . but the zinc coating on the Ti-Co sheet had stayed put! Closest examination revealed not a trace of coating failure anywhere.

This test is, to be sure, rather unusual . . . but the Ti-Co coating has survived even tougher tests without cracking, flaking or peeling. Turn the page for more facts about how Ti-Co can cut your manufacturing costs, improve your products and add greatly to their useful life.



Shown (at the left) are six typical severe forming jobs now being accomplished with Inland Ti-Co: (1) deep-drawing, (2) roll-forming, (3) Pittsburgh lock-seaming, (4) spin-drawing, (5) crimping, (6) perforating.

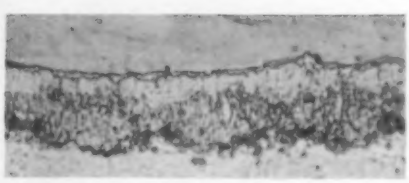
INLAND TI-CO GALVANIZED SHEETS TAKE THE TOUGHEST FORMING OPERATIONS IN STRIDE

Any product that can be formed with steel can be formed with Inland Ti-Co. Ti-Co's ability to withstand even the most severe forming without cracking of the zinc coating makes possible many new galvanized steel products.

The zinc coating on Ti-Co is not only extemely tough but has just enough pliability to actually flow with the base metal as it's formed. Both on the production line and in extended usage, the Ti-Co coating has proved its ability to withstand punishment without leaving the slightest opening for rust to get a foothold. Unlike the conventional galvanized, products made from Ti-Co do not require re-dipping or "touch-ups" after fabricating, and rejects are greatly minimized. Ti-Co products can be depended upon for long service.

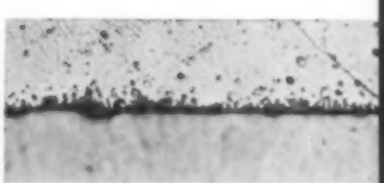
THE SECRET OF INLAND'S NON-FLAKING TI-CO

Inland Ti-Co galvanized steel is made by the patented Sendzimir process, a continuous operation in which the heat treatment of the strip and the application of the zinc coating are performed in one continuous galvanizing line. This process eliminates the brittle iron-zinc alloy layer, that causes flaking in conventional galvanized sheets, and results in production of a sheet on which the zinc adheres so tightly that it can be severely formed without flaking of the coating.



Photomicrograph reveals hard, brittle iron-zinc alloy layers which cause flaking in conventional galvanized steel.

Alloy layers are virtually eliminated in galvanized sheets made by the Ti-Co continuous process of galvanizing.



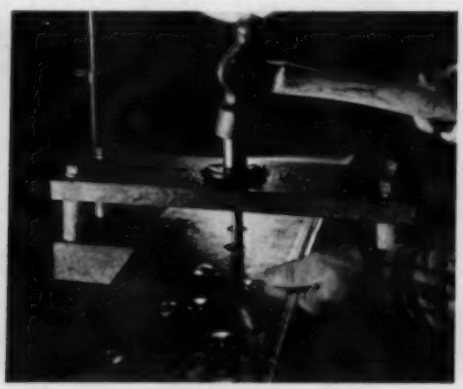
WHY YOU CAN BE SURE OF TI-CO'S QUALITY

Samples from every order of Ti-Co are put through a series of tests far more severe than ever demanded of a galvanized sheet in normal fabrication.

In addition to the coating tests shown below, the Ti-Co quality control routine includes the following tests: Olson Cup test for ductility; Rockwell Hardness test; Weight for Coating test for uniformity; Fluting test of resistance to cross-breaking; Microstructure test for tightness of coating.

HOW YOU CAN TEST TI-CO. Take a piece of the galvanized steel you are now using and bend it back and forward on itself several times. If the coating flakes or peels, it's *not* Ti-Co. For a free sample of Ti-Co to use in making your own "bend test" comparison, please write to Department 297.

LOCK SEAM TEST. The tough 180° bend of a Pittsburgh lock seam is a supreme test of fabricating qualities. Ti-Co takes it!



IMPACT TEST. Rounded punch hammered into Ti-Co sheet dents the steel. But the Ti-Co coating "gives" without cracking.

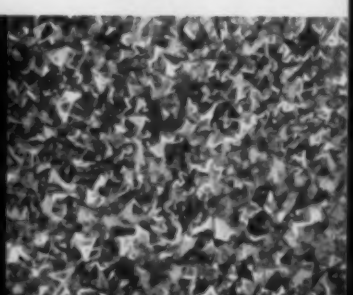
BEND TEST. Hammered flat to a 180° bend, the Ti-Co coating shows no sign of cracking or flaking after repeated pounding.

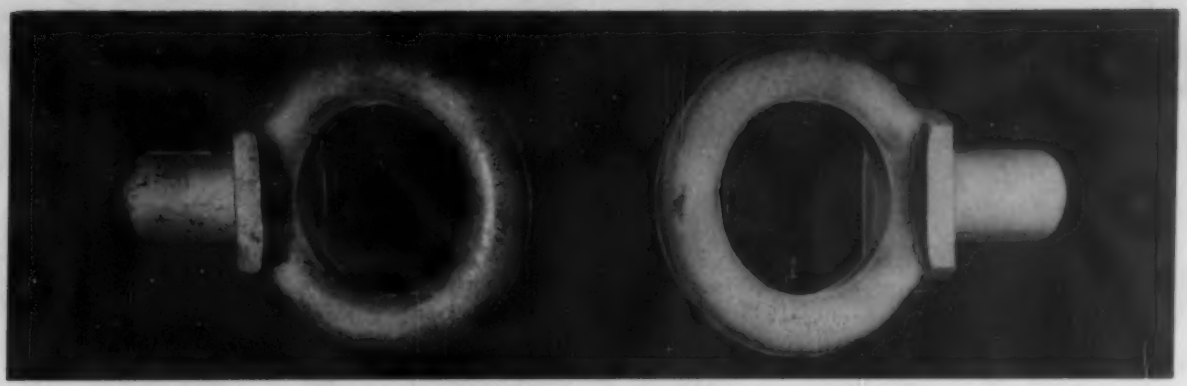
INLAND STEEL COMPANY

38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago • Milwaukee • St. Paul • Davenport
St. Louis • Kansas City • Indianapolis • Detroit • New York

INLAND TI-CO ®





These two identical parts of forged 4140 steel were plated in a fluoborate cadmium solution. Part on left was cleaned by alkali, acid, rinse and then plated. Part on right was liquid honed as received and plated without further treatment

Liquid Honing Smooths the Way

FABRICATORS are finding that liquid abrasive blasting gives them better surface finishes in less time and improves the quality of their product.

Also called liquid honing, it is successfully removing tool marks and burrs from machined surfaces, finishing diecastings, preparing surfaces for plating, finishing tools and dies and removing scale, paint and rust. These applications were given by W. C. Ehlert of R. W. Benton & Co. at a meeting of the American Electroplaters Society.

How It Works—In liquid honing, a mixture of abrasive and water is ejected from a nozzle at high velocity. The nozzle is designed so the mixture, called a slurry, is accelerated by 80-100 psi air pressure as it leaves the tip of the nozzle. In this way, abrasion of the nozzle is reduced.

The abrasive can be aluminum oxide, silicon or organic particles. The size of the abrasive grains, their concentration and velocity can be varied to give a number of surface finishes.

Plating—Liquid honing can replace pickling, electrochemical cleaning and hand finishing of surfaces to be plated. No alkali cleaning is necessary because the blasted surface is chemically and mechanically clean.

The most valuable use of this process in plating is in preparing surfaces of parts subject to hydrogen embrittlement. This is a particularly important factor in plating aircraft parts; heat treat scale can be removed in minutes without subjecting parts to the hydrogen absorption which results from acid pickling.

Finishing—By blasting, the microinch finish of a surface can be considerably improved, especially in intricate sections impossible to clean by wire brushing. The matte finish produced is often smoother than a mirror finish attained by finish grinding.

It is estimated that the surface area of metal increases as much as eight times as a result of liquid abrasive blasting, increasing the surface to which electroplated or painted coating can adhere mechanically.

Inspection—The finish obtained by blasting depends on the smoothness of the base metal. It will not make a rough-ground piece as smooth as a finished-ground piece. It will improve and chemically clean a good finish, but will do little to improve pitted or uneven surfaces. In most cases, the liquid hone method will magnify imperfections.

This makes it a good tool to prepare critical areas for inspection prior to plating, especially aluminum and magnesium castings, forgings and other nonferrous metals. Blasting will expose pits or porosity where machine grinding or polishing has caused metal to flow over these defective areas.

Tools and Dies—Liquid honing produces a cold-working effect similar to that of shot peening. Tests have shown a 24 per cent increase in thread-roller-die life and a 20 per cent increase in crush-ground-die life through blasting.

Abrasive blasting to increase tool life has been done primarily on tools made from high-carbon steel, heat treated to 52-64 Rockwell. This includes thread roller dies, milling cutters, trepanning tools, seating tools and drills.

Die and Mold Cleaning—Heat treat scale can be removed from plastic molding dies by liquid honing. It successfully removes the wire edge left around engraved letters in these dies.

Maintenance of molds in the rubber industry requires frequent removal of carbonized deposits. Liquid blasting has increased the production life of molds cleaned by this method as compared with those which have been chemically and manually cleaned. Liquid blasting does not change mold dimensions and contours.

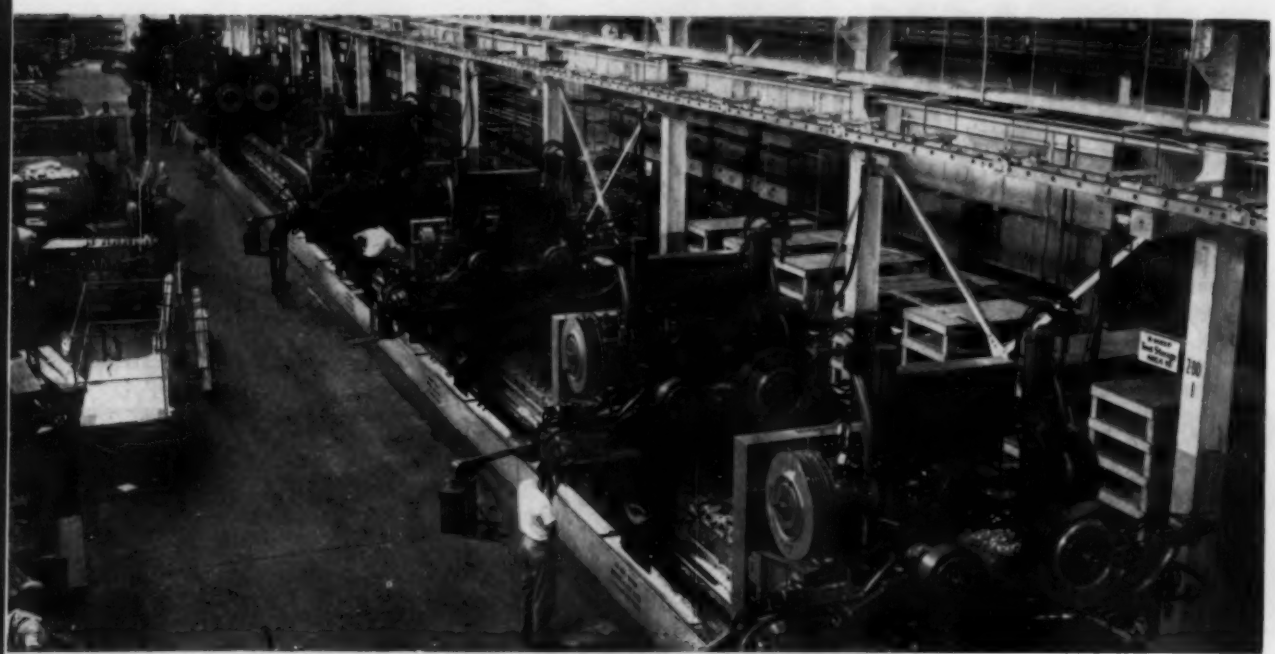
Giants Harnessed for Production

To turn out larger, one-piece aircraft parts, Douglas built a giant fabrication line. But no giant machines unless they can handle production runs, says the firm

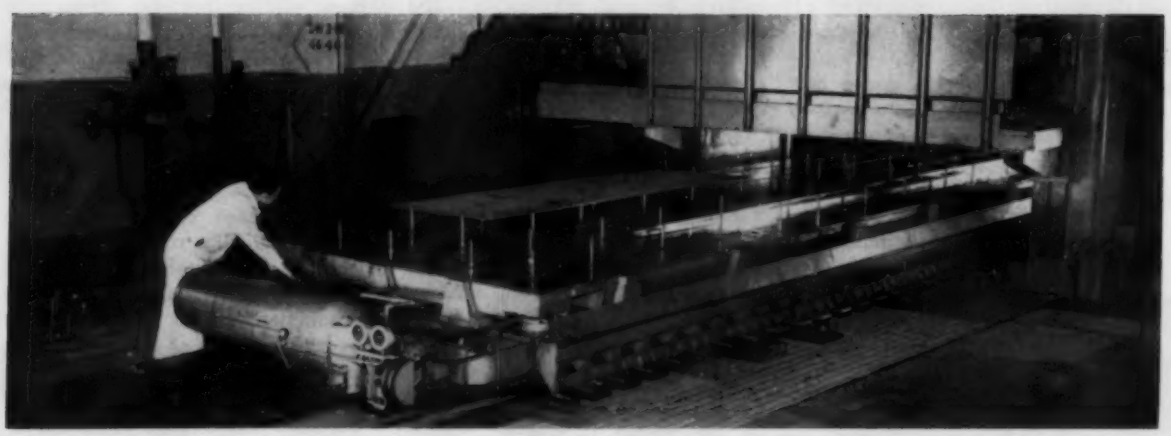
A FABRICATION UNIT SIZE of 10 x 40 ft guides large machine policy at the El Segundo, Calif., plant of Douglas Aircraft.

Engineering effort is being directed to smaller, more effective aircraft, such as the A4D midget shipboard fighter, constructed of large, integrally stiffened parts, rather than fabricated assemblies of riveted or spot welded members. This takes giant machine tools and equipment.

Press Brake—One of these is a Verson press brake of 1800-ton capacity. It can make a 90-degree



The 308-ft long Farnham mill has eight carriages, operates from templates



Pneumatic lifters raise milled parts from bed of Giddings & Lewis mill

bend in 1-in. thick aluminum plate 20 ft long.

Each feed table contains four sections. The two inside sections feed the shorter plates under the ram; the two outside sections handle larger plates.

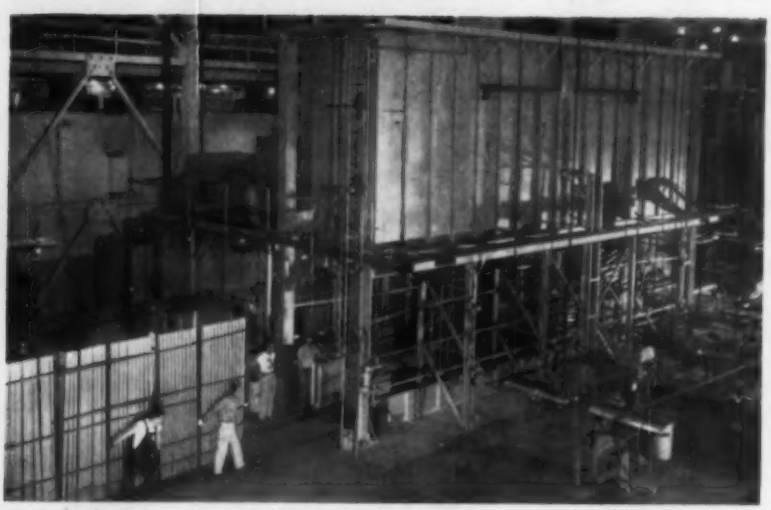
Automatic Control — The motor controlling the feed of the table section is energized by a special notched band of Elgiloy passing over a photoelectric cell. Sections move the plate under the ram a predetermined length and stop. Rollers on the bottom contact and secure the plate while the hit is made. The entire operation is controlled by templates and photoelectric cells.

Movement of the feed table sections and the hydraulic ram are co-ordinated. The segmented ram die blends the contour by progressive hits in segments as small as 1 in., so the completed contour is an arc rather than an angle.

No Springback — A taper can be contoured into a part by operating the feed table sections individually. One end of the long plate is retarded while the other is advanced.

The plates would have a springback effect if unsupported at the back of the brake. To counteract this, a group of micarta-covered roller chains automatically adjusts to nest the finished plate in its approximate contour.

This 1800-ton Verson press brake can bend 1-in. thick aluminum plate



Load is shunted under Knapp-Lee electric quick quench, heat treat furnace

Heat Treating—The heat treat and quench system for the 10 x 40-ft fabrication line handles two 20-ft sections secured together. Material is shunted under the furnace onto rails that rest on hydraulic rams, similar to grease rack jacks. The doors open horizontally, and the rams thrust their load upward into the furnace.

In a nearby anodic system, large mobile baskets hold awkward shapes and clothes-tree-type hangers hold parts under 20 ft long. Can-type containers hold quantities of narrow shapes. Cranes on either side individually control the 20-ft grid.

Giant Mill — A Giddings & Lewis skin and spar mill handles blanks, sheet or plate stock up to 10 x 40 ft. It can be controlled manually or preset and controlled automatically.

Material is secured to the machine's bed with vacuum chucks. Pneumatic lifters raise milled parts from the bed for ease of handling. Feed is controlled by a magnetic tape fed across a photoelectric cell at the same speed as the plate. Notches in the tape permit the electric eye to complete its circuit and halt movement.

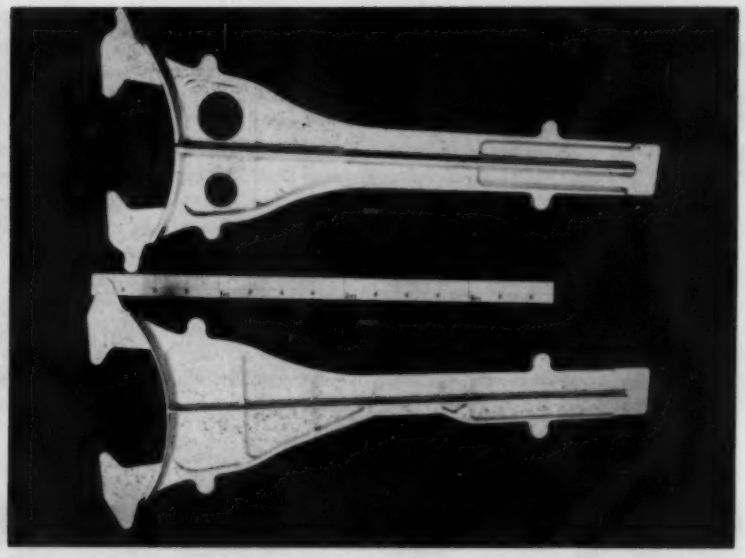
The giant mill is used for pilot runs. When tooling is complete on new models, parts originally produced on the G & L machine are put into production on sculpturing jigs at less cost for tooling and equipment.

Long Mill—Douglas also has a 308-ft long Farnham mill with eight carriages (see STEEL, Sept. 26, p. 118). Straight, twist (horizontal or vertical), cavity contouring and other carriages can perform a sequence of operations over the same setup.

Cutters are controlled vertically and horizontally by hydraulic tracers riding packaged circular templates.

Unlike other planemakers who nest their large machines, Douglas spots its equipment in line of natural production flow or immediately adjacent to production and assembly lines. This cuts part travel and storage time.

Reduced draft, close tolerance forging of root rib for North American F-100



Support forgings for McDonnell F-101. The press extruded forging (lower) replaces the conventional forging (top), saving about 30 lb of forging stock

Heavy Presses Forge a Future

USE OF heavy-press die forgings has been largely in aircraft. Other applications have been made, and considerable effort is being devoted to utilizing the potential of heavy forging presses in all fields.

As of November 1955, there were seven, heavy, closed-die forging presses of 15,000 tons and over operating in the U. S. (see table). Four of these have been added by the U. S. Air Force Heavy Press Program whose mission is advancement in aircraft design.

Benefits—New supersonic, high-performance aircraft require the greatest possible structural strength, with minimum weight and bulk. Heavy forging and extrusion presses can turn out the necessary structures, with a high strength-to-weight ratio, at low cost and in production quantities.

Forging eliminates much machining. By redesigning, certain sections of modern aircraft have been combined into one piece, saving many man-hours in assembly.

Example—Forged on a 35,000-ton press, a wing spar for a delta-wing, all-weather, supersonic interceptor is 10 ft 6 in. long and 18 in. wide with webs 3/16-in. thick. Four forgings replace 272 pieces and 3200 rivets. They save about 100 lb of aluminum per plane.

Heavy Closed-Die Forging Presses Operating in the U. S.—November, 1955

Operator	Rating (tons)	Builder
Alcoa,	15,000	Schloemann
Cleveland	*35,000	United
	*50,000	Mesta
Bridgeport Brass		
Adrian, Mich.	15,000	Schloemann
Wyman-Gordon	18,000	Mesta
North Grafton, Mass.	*35,000	Loewy
	*50,000	Loewy

*Presses in the U.S.A.F. program.

The heavy press closed-die forging technique is producing reduced draft, close tolerance parts. This saves about 20 per cent in machining cost and about 25 per cent in material. A press extruded support forging for the McDonnell F-101 uses about 30 lb less forging stock than a conventional forging. Only 2 lb of material are machined from it before assembly, compared with 23 lb machined off the conventional forging.

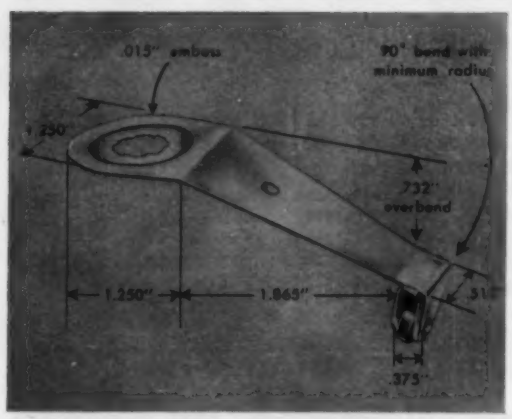
Future—Forging stock suppliers are working on alloys that will provide better properties, forgeability and machinability.

New methods of die design, new short cuts in making models, new materials for dies—these are some of the approaches being tried to reduce die sinking time and cost. Use of die quenching, improvement of heat treatment and other processing of forgings to minimize distortion, both during forging and in subsequent machining, are getting much attention.

Tremendous strides have been made in the short time heavy forging presses have been available. Possibilities appear unlimited.

This railroad runs better, will last longer

A Type ZW Lionel Trainmaster Control has four independent variable voltage circuits, can operate four trains simultaneously.



One of the four variable voltage taps in a Type ZW Lionel Trainmaster Control, now made of .0150" thick Duraflex in spring temper. This temper in Duraflex provides the extra strength needed—with the same forming properties as conventional phosphor bronze in extra hard temper.

Lionel switched to DURAFLEX for the hardest working parts of its Trainmaster controls

Much of the fun of model railroading depends on the smooth, dependable performance of its controls. That's why Lionel makes its Trainmaster controls tough, precision instruments – constantly guards their quality.

Lionel had been using an ordinary phosphor bronze in the vital, hard-working variable voltage taps. But they were troubled with fractures in forming the bends. To maintain their quality standards, they considered using another alloy, at substantially increased cost.

First, however, they tried Duraflex*, Anaconda's new superfine-grain phosphor bronze. The fractures were eliminated. The press room found the forming qualities of Duraflex excellent. The Transformer Department was pleased with the reduction in rejects, found the strength and resilience better.

So Lionel has controls of superior quality – at no extra cost – for Duraflex costs no more than ordinary phosphor bronze.

Duraflex, because of its superfine-grain structure, offers greatly improved fatigue resistance and formability. It also has a finer, smoother, harder surface, plus good electrical conducting properties and high corrosion resistance. It is produced in sheet metal up to 0.062" thick and in wire up to 3/16" diameter. We will provide free samples for test purposes – specify gage and temper. Write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 5005

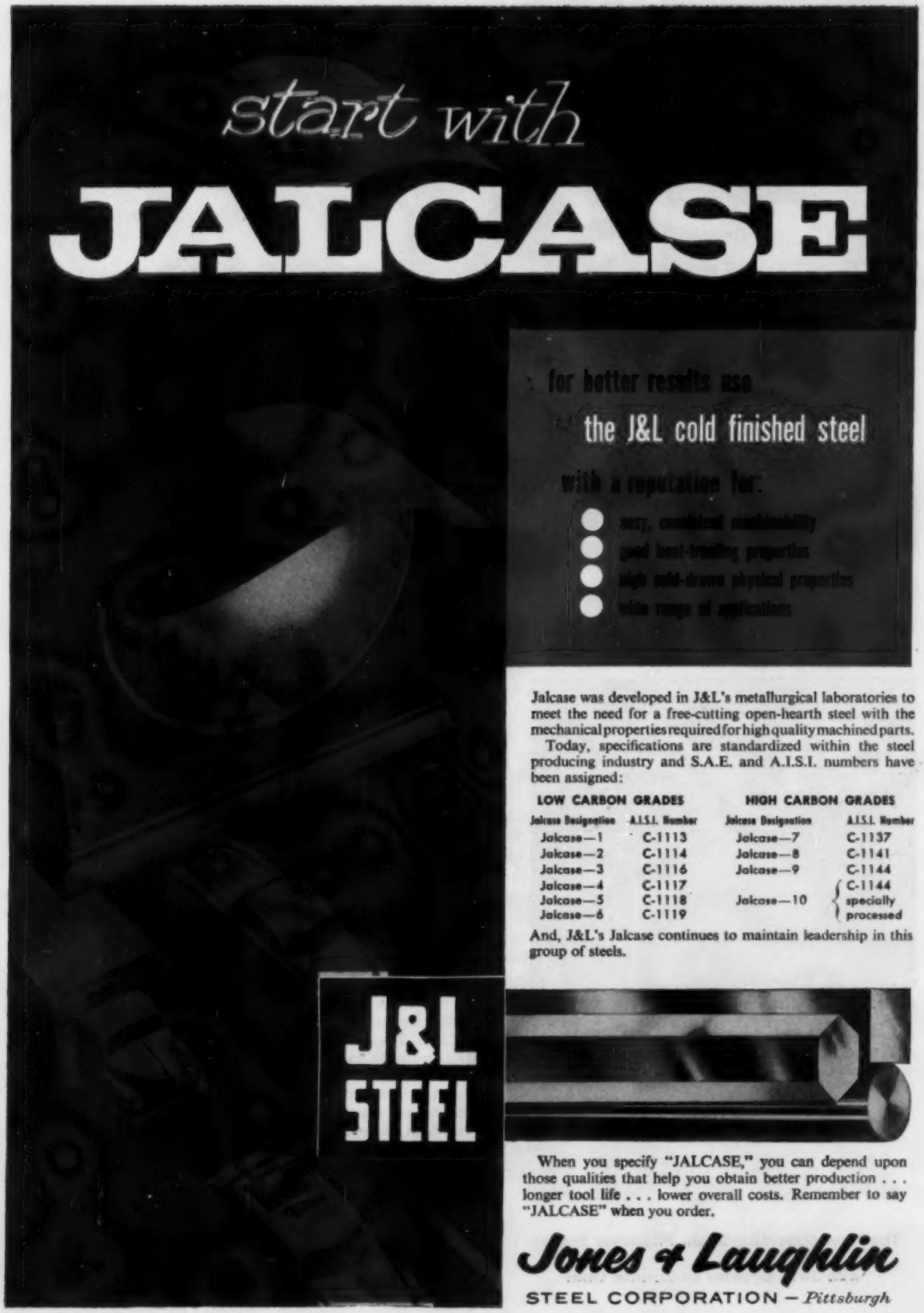
*Trade Mark

DURAFLEX

The New Superfine-Grain Phosphor Bronze

with 30% Greater Endurance Limit

an ANACONDA® product


start with
JALCASE
for better results use
the J&L cold finished steel
with a reputation for:
easy, combined machinability
good heat-treating properties
high cold-drawn physical properties
wide range of applications
Jalcase was developed in J&L's metallurgical laboratories to meet the need for a free-cutting open-hearth steel with the mechanical properties required for high quality machined parts.
Today, specifications are standardized within the steel producing industry and S.A.E. and A.I.S.I. numbers have been assigned:
LOW CARBON GRADES
Jalcase Designation
A.I.S.I. Number
Jalcase—1
C-1113
Jalcase—2
C-1114
Jalcase—3
C-1116
Jalcase—4
C-1117
Jalcase—5
C-1118
Jalcase—6
C-1119
HIGH CARBON GRADES
Jalcase Designation
A.I.S.I. Number
Jalcase—7
C-1137
Jalcase—8
C-1141
Jalcase—9
C-1144
Jalcase—10
C-1144 specially processed
And, J&L's Jalcase continues to maintain leadership in this group of steels.
J&L STEEL
When you specify "JALCASE," you can depend upon those qualities that help you obtain better production . . . longer tool life . . . lower overall costs. Remember to say "JALCASE" when you order.
Jones & Laughlin
STEEL CORPORATION — Pittsburgh

Diecasting Machines Come in Hot and Cold Chamber Models

These new machines are expandable. Furnished as a basic tool, at a low initial investment, the units are equipped with only the essentials.

As production requirements change, additional features can be added quickly at the plant at low cost.

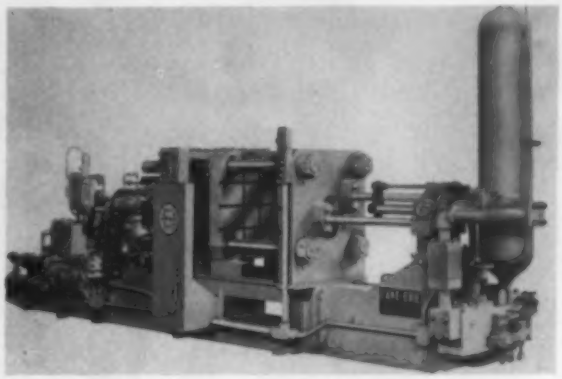
Capacities are 250, 450, 650 and 850 tons.

All machines have a knuckled wedge cam toggle. It automatically takes up clearances in dies caused by heat expansion. The knuckled joint eliminates shear stress on the pins when under locking pressure.

Piping and joints are reduced by improved manifold valving. Flexible sequencing core-pull valving eliminates the specialist ordinarily needed to make changes from one sequence to another.

Hot chamber machines have a furnace that can be adjusted from the machine center line to below center. Packing failures are reduced by a water-cooled jacket around the injection cylinder ram.

Cold chamber units have injection speeds of about



10,000 ipm. Pressures on the injected metal are about 33,000 psi. *Write*: Lake Erie Engineering Corp., Box 68, Kenmore Station, Buffalo 17, N. Y. *Phone*: Bedford 6900

Milling Machine Eliminates Belt Changes

An infinite speed drive on this vertical miller gives any speed from 80 to 570 rpm (low range) to 584 to 3800 rpm (high range).

The operator can check the exact spindle speed on a built-in tachometer.

The infinite quill feed gives a power feed to the spindle up to 0.008-in. Simple positive control of the quill feed makes it easy to obtain correct depth when blind drilling.

Moving the quill feed control lever to neutral stops the spindle feed; it's not necessary to stop the spindle. A positive clutch in the center of the quill handwheel also provides instant quill feed control.

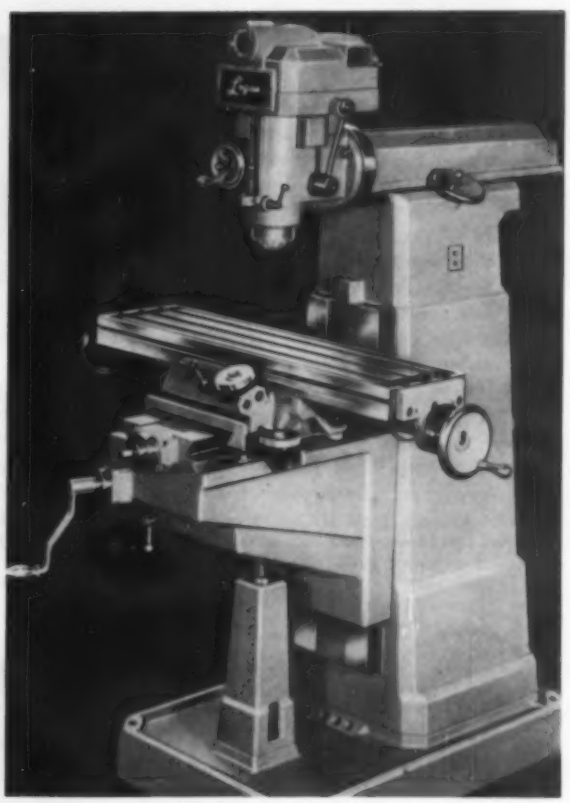
Extra heavy ways and rugged construction give smoothness, even on heavy cuts.

The ram slides on dovetailed ways that provide a rigid clamping surface 16 in. long.

No motor shock or vibration is transferred to the spindle; the 1½-hp, three-phase motor is mounted in the base of the machine rather than atop the quill.

The ground table has a 9 x 36-in. working surface. The range is 18 in. longitudinal, 10 in. traverse and 16 ⅝-in. vertical.

The spindle nose is a collet-chuck type. The head (easily swiveled 360 degrees) rotates on a rigid sleeve mounting that maintains exact right-angle alignment. *Write*: Logan Engineering Co., 4901 W. Lawrence Ave., Chicago 30, Ill. *Phone*: Pensacola 6-7500



W-T ALKER-TURNER

COMPARE — You'll see that you get a lot more for your money when you buy W-T "Light-Heavyweights"!

You can install this new time-saving, money-saving Air Feed in 10 minutes!

100% PNEUMATIC! NO ELECTRICAL CONNECTIONS! NO MACHINING! Wherever you have repeated drilling and related operations, this new Walker-Turner Air Feed will whittle down your costs and put you in a much better competitive position. It converts any Walker-Turner, or W-T type, Drill Press up to 1" capacity to a high production power-fed drilling machine. Gives sensitive, automatic feed control for a wide variety of production operations in metal or wood. Even short-run jobs are more profitable when you install Air Feed! . . . Air Feed Attachment for 15" and 20" Drill Presses, 4" and 6" spindle travel; prices start at $185. Air Feed-equipped Walker-Turner 15" and 20" Drill Presses, 4" and 6" spindle travel; prices start at $353. . . . Ask your Walker-Turner Distributor to *demonstrate*. He's listed under "Tools" in your phone book's Yellow Pages. Or write today for his name and your new, *free* Manual.

DRILL PRESSES, HAND AND POWER FEED — AIR FEED DRILL PRESS ATTACHMENT — RADIAL DRILLS — WOOD AND METAL CUTTING BAND SAWS — TILTING ARBOR SAWS — RADIAL SAWS — JIG SAWS — CUT-OFF SAWS — LATHES — SPINDLE SHAPERS — JOINTERS — BELT AND DISC SURFACERS — FLEXIBLE SHAFT MACHINES

walker-Turner

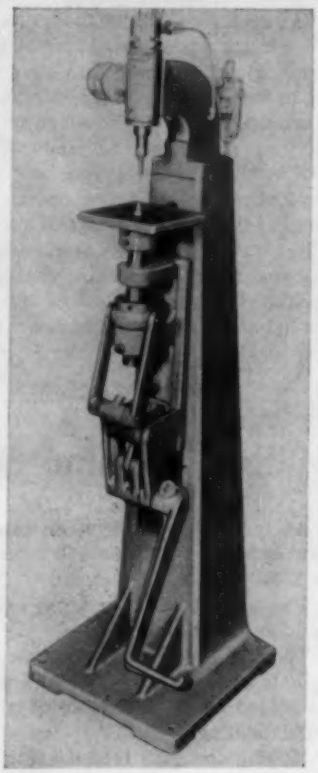
WALKER-TURNER
Division
Kearney And Trecker Corporation • Plainfield, N. J.

NEW PRODUCTS and equipment

Riveting Machine

A synchronous-motor, automatic timer, combined with adjustable impact and an elevating anvil, makes it possible to rivet fragile or easily distorted materials that could not be riveted before.

The timer accurately controls the time for riveting or peening blows of the hammer.



The timer is cased so it can be mounted wherever convenient—most often in the base of the column. *Write*: Hill Machine Co., 1301 Eddy Ave., Rockford, Ill. *Phone*: 7-5781

Thread Insert

Tapping of threads is eliminated by the push insert. The insert is pushed into a straight-sided, plain hole (drilled, molded or diecast) to provide strong, wear-resistant female threads for nonstructural parts.

The insert is made from wire coiled into a helix. The push insert is tightly wound; adjacent coils are in contact; and no driving tang is needed because the insert

S.S. United States . . . most modern, fastest liner afloat.

Nothing finer!

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a conservative organization:

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You, too, *pay* for the best spring steel . . . make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

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ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13235 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK

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- The Engineer can specify materials closer to the most desirable design requirements because of the large range of sizes and materials offered in B&W Hollow Forgings.
- The problem of maintaining production schedules is made easier due to good delivery on both large and small quantities.
- B&W Hollow Forgings of the specified analysis produced from initial electric furnace melting under carefully controlled conditions are high-quality forgings that —in use—mean savings in time and cost.
- Because the outside surface of every B&W Hollow Forging is machined, the surface finish and appearance are superior and the user's fabrication cost is sharply reduced.
- Special design requirements can be met; special shapes, special end preparations such as end closures, reduced diameter, flanges and the like.
- To get the *complete* picture of what B&W Hollow Forgings offer you, send for the new B&W Hollow Forgings Bulletin, S-16B. The Babcock & Wilcox Company, Process Equipment Department, Barberton, Ohio.

BABCOCK & WILCOX

BOILER DIVISION

S-448

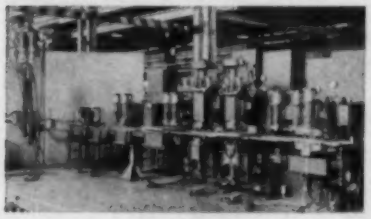
is merely pushed in the hole.

When a screw is turned into the threads provided by the insert, a run-out thread on the screw automatically wedges the top coil of the insert into the parent material which securely anchors it.

Anchoring in light metals can be done by upsetting the metal around the hole. *Write*: Heli-Coil Corp., Danbury, Conn. *Phone*: Pioneer 3-3851

Welding Line

This resistance welding line makes ¾ and 1-hp, air-conditioning units with 50 per cent less manpower. Production is increased 100 per cent.



The seven machines have from 50 to 250 kva. Only three operators are needed. Production: 72 units an hour. *Write*: Sciaky Bros. Inc., 4915 W. 67th St., Chicago, Ill. *Phone*: Portsmouth 7-5600

Tube Sheet Drilling

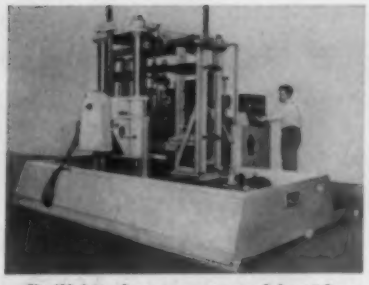
The speed of a two-way drilling machine and the accuracy of a horizontal boring machine are combined.

Precision locating permits drilling on closely spaced centers in selected drilling patterns.

The machine drills tube sheets (of ferrous and nonferrous materials up to 6 ft in diameter and 10 in. thick) used on heat exchangers, condensers, evaporators and heaters. Thinner sheets and baffles can be drilled in stacks.

Drill feeds go up to 18 ipm. Load meters for each of the two drilling-head motor drives indicate drill sharpness and hard spots. The machine can be set to retract under overloads.

A high pressure coolant system makes gun drilling possible. Holes from ¾ to 1½-in. can be drilled.



Drill heads are powered by 10 or 15-hp motors. The heads have four speed selections and variable hydraulic feeds. *Write*: Walter P. Hill Inc., 22183 Telegraph Rd., Detroit 19, Mich. *Phone*: Kenwood 4-9190

Iron Powder Electrode

Worn parts are built up fast with this electrode designed for maintenance and repair welding.

It produces a medium-carbon, medium-alloy deposit. Resisting shock and abrasion, it is a dense, moderately hard, tough, machinable surface.

Chromium carbide in the deposit

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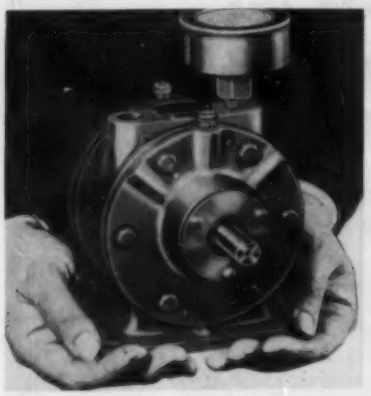
gives abrasion resistance 25 to 50 per cent greater than conventional electrodes.

The hardness range is from 27 to 40 Rc. Hardness can be increased by water quenching.

The electrode comes in 5/32, 3/16 and ¼-in. sizes. *Write*: Lincoln Electric Co., 22801 St. Clair Ave., Cleveland, O. *Phone*: Ivanhoe 1-8100

Rotary Air Motor

This 2-hp motor weighs only 17 lb. A simple valve control gives explosionproof, variable-speed power up to 2000 rpm on air line pressures from 30 to 90 psi.



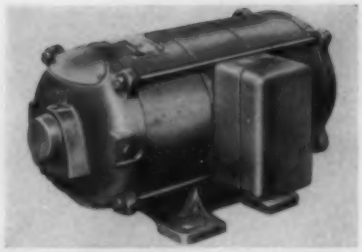
Four light composition vanes that slide in the rotor maintain a continuous, efficient seal and take up their own wear automatically. The motor starts with the shaft in any position. *Write*: Gast Mfg. Corp., Box 117N, Benton Harbor, Mich. *Phone*: Walnut 6-6171

Motor-Generator Sets

Fractional horsepower sets offer an inexpensive and reliable way to get direct current from an alternating-current source. Sets come in Nos. 44, 66 and 74 frame sizes.

The units are used as a power supply for product testing in plant labs, as a power supply for variable-speed motors, as self-contained exciters of larger units and as an energy supply for magnetic chucks.

Air cooling makes continuous operation at rated loads possible. Shaft alignment problems are eliminated by mounting both motor



and generator rotors on a common shaft.

The dripproof, ball-bearing, solid-base sets are available in various input combinations of standard frequencies, voltages and phases and with 250, 500 and 750-watt, dc outputs. *Write*: Specialty Component Motor Dept., General Electric Co., Schenectady 5, N. Y. *Phone*: 4-2211

Aluminum Coolant

A stain-free coolant for cutting and grinding aluminum prevents the welding of chips and dust to tools and wheels.

It mixes easily with water to form a stable emulsion and has a high degree of lubricity and detergency. It produces a superior finish both in appearance and profilometer readings.

The coolant can be used with central cooling systems and does not react with aluminum dust. *Write*: Dept. A 55, International Chemical Co. Inc., 2628 N. Mascher St., Philadelphia 33, Pa. *Phone*: Regent 9-2313

Pipe Thread Rolling

Here are attachments for thread rolling on screw machines, lathes and other turning machines.

One attachment for machines of 1¼-in. capacity and larger will roll five sizes of pipe threads from ⅛ to ¾-in. The other, for machines of 9/16-in. capacity and larger, will roll three sizes—⅛, ¼ and ⅜-

in. To change sizes, only thread rolls need be changed.

Threads are held accurate to 0.0005-in. *Write*: Salvo Tool & Engineering Co., 26441 Gratiot Ave., Roseville, Mich. *Phone*: Prescott 6-4700

Portable X-Ray

An extremely low weight-to-power ratio in this unit makes possible wider use of radiography in weld inspection.

The x-ray head weighs only 46 lb and gives a power penetration of 140 kvp. It makes spot check

radiographs on steel up to 1½-in. thick. It is intended to take the place of sectioning inspection methods. *Write*: Balteau Electric Corp., Stamford, Conn. *Phone*: Davis 4-6118

Shielding Gas

This argon-hydrogen mixture replaces helium. It shields Heliarc welding of stainless steel, Monel, Inconel and other metals.

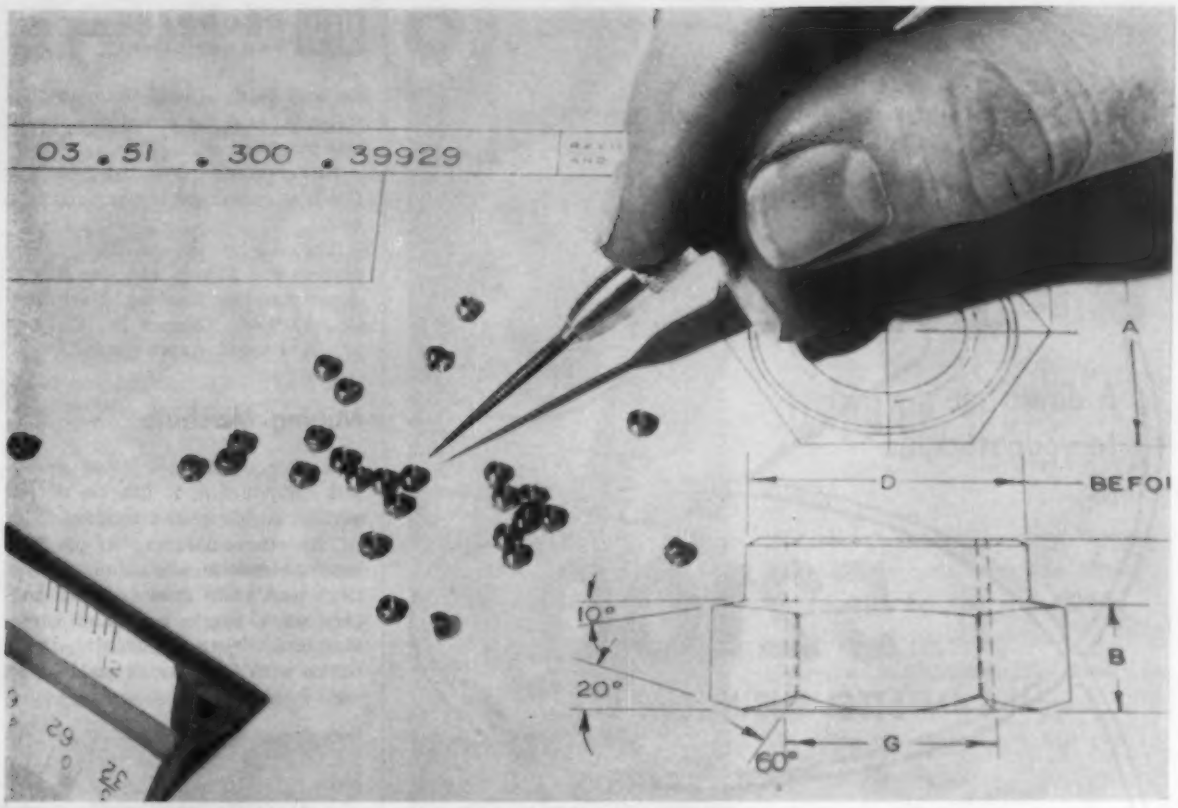
Hydrogen in the mixture permits relatively high arc voltages, resulting in high welding speeds.

Compared with helium, substantially reduced flow rates are needed to give adequate shielding to the weld zone. *Write*: Linde Air Products Co., division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y. *Phone*: Murray Hill 7-8000

Diecasting Machine

Up to 700 shots an hour are made by a diecaster with 80 tons of locking pressure. Shot capacities go up to 2½-lb.

A gooseneck machine is for zinc,



FLEXLOC Micro locknuts meet designers' needs for tiny precision nuts that retain strength and holding power in the smallest assemblies—servomechanisms, electronic and electrical equipment, all miniature devices.

Design Lighter, More Compact Products with New FLEXLOC Micro Nuts

Standard Miniature Locknuts Permit Design Engineers to Develop and Fasten Smaller Assemblies Safely

SIZE	Across Flats		Shoulder Height		Across Corners	Height +.000 −.003
	MAX.	MIN.	MAX.	MIN.	MIN.	
0-80 NF-3B	.111	.107	.047	.042	.123	.075
1-64 NC-3B	.127	.123	.0635	.0585	.141	.090
1-72 NF-3B	.127	.123	.0635	.0585	.141	.090
2-56 NC-3B	.158	.153	.068	.063	.176	.105
2-64 NF-3B	.158	.153	.068	.063	.176	.105
3-48 NC-3B	.190	.183	.071	.066	.210	.120
3-56 NF-3B	.190	.183	.071	.066	.210	.120
4-40 NC-3B	.190	.183	.072	.067	.210	.120
4-48 NF-3B	.190	.183	.072	.067	.210	.120

STANDARD FLEXLOC Micros—in sizes ranging from 0-80 to 4-48—are available in brass (either plain or cadmium plated). Consult SPS for miniature nuts of other conventional materials.

New FLEXLOC Micro locknuts are smaller and lighter than regular FLEXLOCS of the same nominal diameter. Wrenches of smaller size are used to install them. Mating joints or flanges can be designed smaller—with no loss in strength or convenience of assembly.

FLEXLOC Micros have all the advantages of larger FLEXLOCS. One-piece, all-metal construction—nothing to put together, come apart, lose or forget. Use them as lock or stop nuts—they stay put anywhere on a threaded member as soon as the locking threads are fully engaged. Uniform locking torques insure accurate preloading. There are no nonmetallic inserts to pop out or deteriorate. Moisture, dryness, oil, temperatures to 250°F won't affect these Micro nuts. Just screw them on. They lock and stay locked. Vibration won't shake them loose.

For complete information on FLEXLOC Micro locknuts, consult your authorized SPS distributor. Or write STANDARD PRESSED STEEL CO., Jenkintown 33, Pa

STANDARD PRESSED STEEL CO.

FLEXLOC® LOCKNUT DIVISION SPS

JENKINTOWN PENNSYLVANIA

NEW PRODUCTS and equipment

tin and lead; a cold-chamber machine is used for aluminum, brass and magnesium.

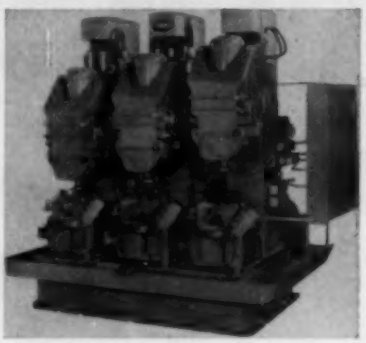
Either standard or fire-resistant fluids may be used in the hydraulic unit.

The die stroke is 6½-in. Die platens are 17¾ x 17¾-in. *Write*: American Die Casting Machinery Co., 1516 W. Thomas St., Chicago 22, Ill. *Phone*: Armitage 6-3334

Milling Machine

A special machine using standard components, it has an output of 360 clutch plates an hour.

The three-column, triple-head machine uses three, standard, vertical feed units mounted in a battery on a single base and three, standard, 20-in. hydraulic index tables with three work stations on each head.



Each feed unit has a horizontal cutting tool. Each index table is cycled to mill, in turn, each of the three lugs on the clutch ring. All milling on a single clutch ring is done by the same horizontal tool.

The machine is automatic, except for loading and unloading, and is operated by one man. *Write*: Michigan Drill Head Co., P. O. Box 4643, Detroit 34, Mich. *Phone*: Jefferson 9-4200

Metal Armoring

A multistage precision process, Armoloy, uses electrodeposition. It can be applied to practically any point of friction between metals and is rigidly controlled to give surfaces within specified dimensions.

Metal bearing and cutting sur-

faces are given a hard, long-wearing coating. Savings have been two-thirds in the maintenance and replacement of hobs, and the life of bandsaw blades, taps and cutting saws has been increased.

Armaloy has been tested successfully on bearings, ball races, plow shares, machine tools, dies and small cutting tools, such as drills and reamers. *Write*: Fort Worth Steel & Machinery Co., Ft. Worth, Tex. *Phone*: Wilson 4255

Heat Treating Basket

This Inconel stacking basket can carry a 2½-ton load into a pit furnace. It will withstand temperatures up to 2200° F.

Rigid construction, portability and adaptability keep the baskets in continuous use for a long time—without repair, replacement or down time.

The bottom of each basket is made of screen laid over an Inconel grid. The complete unit (three baskets) weighs 1200 lb. Each will carry 1750 lb. *Write*: Wire Mfg. Co., 40 Mason St., Bridgeport 5, Conn. *Phone*: Forest 6-3494

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Speed bundling jobs with **Behr-cat**® strapping tape

With modern Behr-cat Strapping Tape on hand, your packers will turn out better work in less time. This filament-reinforced, pressure-sensitive tape sticks at a touch without wetting, holds firmly during handling and shipping, and comes off with an ease that your customers appreciate.

Write for this informative booklet "Approved Packaging Specifications for Pressure-Sensitive Strapping Tape". Address Behr-Manning, Troy, N. Y., Dept. S-1.

In Canada: Behr-Manning (Canada) Ltd., Brantford.
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T-4

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The story of why industry is growing in Mississippi is as simple as the nursery rhyme. Even Little Boy Blue is wide awake to Mississippi's advantages and blowing his horn. Plentiful raw materials at hand, overnight delivery to hungry markets in the South, Southwest and Mississippi Valley, and willing, adaptable labor are worth tooting about. Many manufacturers, too, are in tune with the times and aware of these advantages. Get the facts and join in.

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NEW literature

Write directly to the company for a copy

Automatic Presses

A complete line of presses for operating at speeds up to 800 strokes a minute is presented—catalog 27C, 28 pages. E. W. Bliss Co., Canton, O.

Buffing and Polishing

Over 100 compounds for cutting and coloring are described—bulletin Co-103, 24 pages. Hanson-Van Winkle-Munning Co., Matawan, N. J.

Industrial Paint

A 20-page brochure presents the advantages of a custom-formulated finish. Paint Division, Glidden Co., 11001 Madison Ave., Cleveland 2, O.

Tubes

Carbon, alloy and stainless steels for heat exchanger and condenser tubes and their installation are described—bulletin TB-329B, 8 pages. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

Xerography

Twelve pages describe copying equipment for all kinds of paper-work duplicating. Dept. X-260, Haloid Co., Rochester 3, N. Y.

Automatic Bar Machine

An 8-page bulletin describes a single spindle machine with dial controlled spindle speeds and tool feeds. Cleveland Automatic Machine Co., Cincinnati 12, O.

Boring and Turning Machines

Catalog K-5 describes 30, 36 and 46-in. vertical boring and turning machines.

Bulletin K-10 covers a 56-in. machine. King Machine Tool Division, American Steel Foundries, 1150 Tennessee Ave., Cincinnati 29, O.

Strapping Machine

Equipment for bundling and palletizing with round steel strapping is covered in a 4-page bulletin. Gerrard Steel Strapping Division, U. S. Steel Corp., 2915 W. 47th St., Chicago 32, Ill.

Free-Machining Steel

A high-strength bar and its properties are covered in a 20-page brochure. La Salle Steel Co., Hammond, Ind.

Overhead Materials Handling

Stresses in various tracks used in overhead systems are discussed and data on Tramrail components are

NEW LITERATURE

given—booklet 2008-L, 12 pages. Cleveland Tramrail Division, Cleveland Crane & Engineering Co., 8088 E. 289th St., Wickliffe, O.

Motor-Generator Sets

Large, pedestal-bearing, synchronous, motor-generator sets for rolling mills, mine hoists, etc., are described in an 8-page bulletin. Allis-Chalmers Mfg. Co., 1021 S. 70th St., Milwaukee, Wis.

Worm Gearing

Assembly procedure for double-enveloping worm gearing using taper roller bearings is given—bulletin CA-55, 12 pages. Cone-Drive Gears Division, Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.

Grommet V-Belts

Belts that concentrate load-carrying cords in twin grommets are described in a 4-page bulletin. Industrial Products Division, B. F. Goodrich Co., Akron, O.

Heat Exchangers

Impervious graphite heat exchangers are explained in a 12-page bulletin. Falls Industries Inc., Aurora Road, Solon, O.

NEW BOOKS

1955 *Directory,* Steel Founders' Society of America, 606 Terminal Tower, Cleveland 13, O. $10.

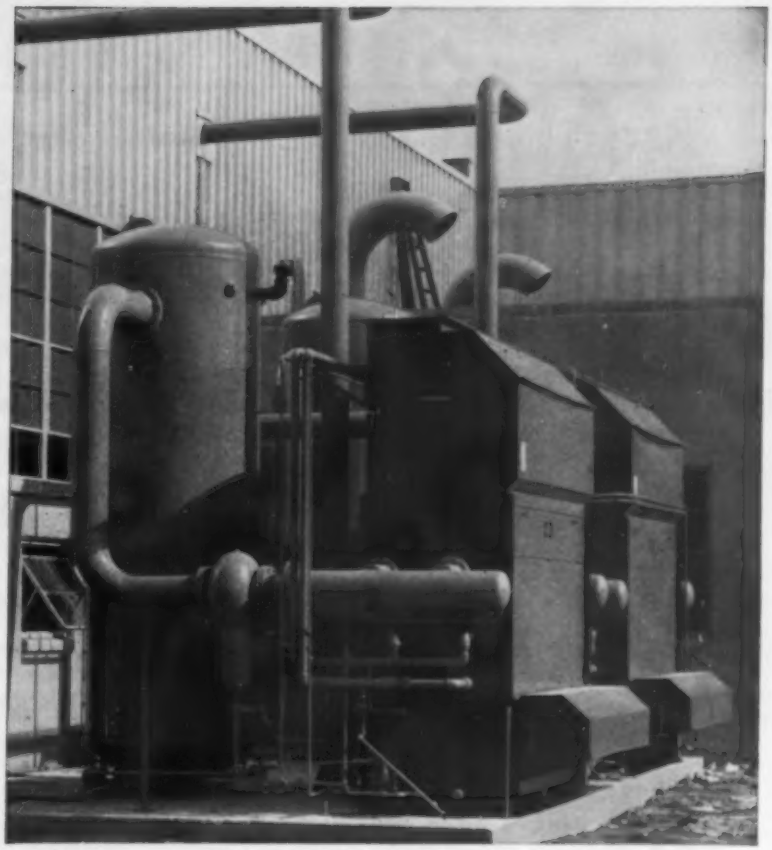
Steel foundries in the U. S., Canada and Mexico, the type of castings they make, their capacity and number of employees are listed.

Handbook of Fastening and Joining of Metal Parts, Vallory H. Laughner and Augustus D. Hargan, McGraw-Hill Publishing Co. Inc., 327 W. 41st St., New York 36, N. Y. 622 pages, $15.

An extensive compilation of data on standards, performance and methods aids in selection of ways to assemble metal parts and products.

Metals Handbook, 1955 *Supplement,* American Society for Metals, 7301 Euclid Ave., Cleveland 3, O. 200 pages, $6.

Practical information on a wide variety of metalworking subjects that require up-to-date reference material, covers metals and applications, design and application, processing and fabrication and testing and inspection.



This Niagara Aero After Cooler also cools compressor jacket and intercooler water.

COMPRESSED AIR... Lower in Cost Dependably Drier and Cooler Trustworthy for Instrument Use

THE NIAGARA *AERO* AFTER COOLER offers a completely self-contained method replacing both shell-and-tube cooler and cooling tower. It is independent of a large supply of cooling water and consistently reduces compressed air temperatures to below ambient. Its drier air gives you a better operation and lower costs in the use of all air-operated automatic instruments, tools and machines, paint spraying, sand blasting and moisture-free air cleaning.

Direct saving in the cost of cooling water saves the price of the Niagara *Aero* After Cooler in less than two years. Water saving also means less expense for piping, pumping, water treatment and water disposal, or you get the use of water elsewhere in your plant where it may be badly needed.

Niagara *Aero* After Cooler assures all these benefits because it cools compressed air or gas below the temperature of the surrounding atmosphere; there can be no further condensation in your air lines. It condenses the moisture by passing the air thru a coil on the surface of which water is evaporated, transferring the heat to the atmosphere. It is installed outdoors, protected from freezing in winter, proven in service on the largest plant utility air systems.

Write for complete information; ask for Bulletin No. 130

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District Engineers in Principal Cities

the magazine of automatic operations

They're looking in

AUTOMATION

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A glance at the mail that crosses our editors' desks every morning would give you a new concept of the *intense interest* in this magazine. Company names and titles read like a Who's Who of American Industry.

They're getting in touch with us for answers to their automation problems. To them, in a little more than a year, AUTOMATION has become *headquarters* for information *on making operations more automatic.*

Reader reaction has been astonishing. Since our first day of publication — *individual requests from readers of* AUTOMATION *total more than* 50,000!

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Because the editors of AUTOMATION, by their outstanding editorial job, have won an enthusiastic reader following *wherever* more automatic operation is the goal. It's the *one* magazine that's devoted *entirely* to filling the gap for *information on all phases of automatic operations* . . . fabrication . . . processing . . . treating . . . weighing . . . handling . . . gaging . . . assembling . . . finishing . . . and packaging.

Moreover, there's an *urgency* about all this reader interest that creates a tremendous *selling opportunity* for you. Latest information we have on our readers' plans for automatic operation shows that all previous estimates fell far short of present spending plans.

In going ahead, many readers need information now that tells *where* they can buy what they want. They're eager to know *"who has it?"*

They're looking in AUTOMATION *for the answers!*. Their big interest is automatic operation . . . and what can you do to help them? That's a brand new, major job for your advertising.

Here, concentrated in one circulation, you've got the vitally interested men responsible for pushing ahead their companies' plans for more automatic operations . . . the men who are spending Big Money for automatic equipment.

They're looking in AUTOMATION for the answers . . . now it's up to *you!* Today, contact your AUTOMATION representative.

AUTOMATION *a PENTON publication* • *Penton Building, Cleveland* 13, *Ohio*

Market Outlook

STEEL PRODUCTION is losing no time getting the new year started.

In the week ended Jan. 8, steel for ingots and castings poured out at 97 per cent of the new and increased capacity rating—the rating effective Jan. 1. On the basis of the figure used for 1955 capacity, operations in the week ended Jan. 8 were at 99 per cent of capacity.

A NEW BASIS—The 1955 capacity rating of 2,413,278 net tons prevailed on Jan. 1 of that year. Throughout the year, capacity rose moderately, but the Jan. 1 figure continued in use as the basis for figuring operating rates. By Jan. 1, 1956, the weekly capacity had increased to 2,461,893 net tons. That is the figure used to compute 1956 rates.

On an annual basis, the capacity increase amounted to 2,534,780 net tons. This pushes the annual capacity to a record of 128,363,090 net tons as of Jan. 1, 1956.

CONTRAST—The 97 per cent operating rate in the latest week is in sharp contrast to the year-ago performance of 80.5 per cent. Business then was just beginning to pick up. Steel production in 1955 started at a low pitch and ended at a high one.

FULL BOOKS—Current production represents orders booked 30 or more days ago. Over-all demand continues just as high as it was then. Producers are well booked up for as far ahead as they will accept orders. Although the automobile industry—the largest consumer of steel — is lowering its production sights a little, it isn't making comparable reductions in its demand for steel. Even after shaving its programs down, the auto industry plans to produce about the same number of passenger cars as it did in the record January of 1955.

Any reduction the auto industry might make in steel demand is likely to be offset by demand from the construction industry and builders of railroad freight cars. While they don't use the same forms of steel as the auto industry, the tonnage of the over-all demand won't change much.

CRITICAL LIST—The most critically short steel product is plates. Following closely are structural shapes, sheets and bars—in that order. Putting pressure on plates are the heavy requirements for construction, pipelines and freight cars.

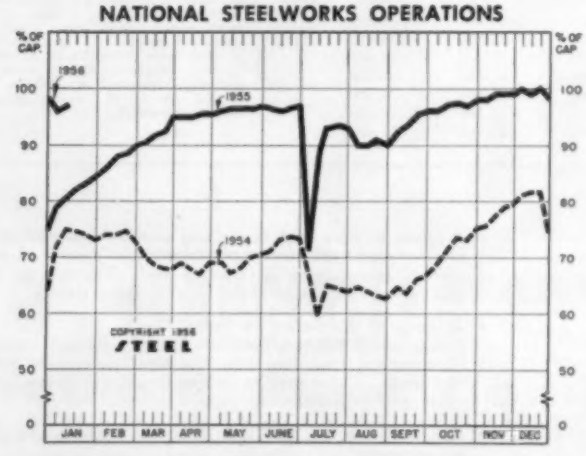
Some of the larger structural steel users have enough business booked to keep busy all this year; some of the medium-size shops have enough for seven or eight months.

Hot-rolled and cold-rolled sheets are in heavy demand—due partly to the auto industry's requirements.

Makers of carbon bars have more business the they can handle. Utilities are covering more heavily than usual on seamless pipe. It looks like tin plate consumption will outrun the high rate of 1955.

STIMULANTS—Not only is high consumption a stimulant to buying, but so is the expectation of a price increase. Steel producers are saying their costs are climbing. In addition, the steelworkers' contract comes up for negotiation at the end of this half, and everyone expects the result to be higher wages and higher prices.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Jan. 8	Change	Same Week 1955	Same Week 1954
Pittsburgh	98	+ 2*	78	89.5
Chicago	98	— 2*	85.5	80.5
Mid-Atlantic	96	+ 2.5	72	82
Youngstown	100	0*	86	80
Wheeling	98.5	+ 2*	94.5	82
Cleveland	96.5	— 1*	94.5	86.5
Buffalo	105	0	100	78
B'rmingham	93.5	— 1	74.5	95
New England	92	0	74	75
Cincinnati	88.5	+ 1*	72.5	71
St. Louis	99	— 6	78.5	73
Detroit	100	0	83	93
Western	103	— 5	73	80.5
National Rate	97	+ 1*	80.5	75

INGOT PRODUCTION‡

	Week Ended Jan. 8	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	147.7†	143.7	150.4	122.0
NET TONS (In thousands)	2,373†	2,309	2,416	1,960

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 21

Technical Outlook—p. 57

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Jan. 3 1956	Dec. 27 1955	Month Ago	Dec. Average
(1947-1949=100)	155.7	155.6	154.6	154.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Jan. 3

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parenthesis. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.183
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	8.293
Tie Plates	5.625	Strip, C.R., Stainless, 403 (lb)	0.444
Axles, Railway	8.000	Strip, H.R., Carbon	5.406
Wheels, Freight Car, 33 in. (per wheel)	32.50	Pipe, Black, Buttweld (100 ft)	16.997
Plates, Carbon	4.950	Pipe, Galv., Buttweld (100 ft)	20.792
Structural Shapes	4.867	Pipe, Line (100 ft)	167.167
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R., Alloy, High Speed W-18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon	20.980
Bars, H.R., Alloy	9.40	Tubing, Mechanical, Stainless, 304 (100 ft)	178.897
Bars, H.R., Stainless, 302 (lb)	0.450	Tin Plate, Hot-dipped, 1.25 lb	8.933
Bars, H.R., Carbon	5.50	Tin Plate, Electrolytic, 0.25 lb	7.633
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.733
Bars, C.F., Carbon	8.660	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.175	Wire, Drawn, Stainless 430 (lb)	0.578
Bars, C.F., Stainless, 302 (lb)	0.469	Bale ties (bundle)	6.473
Sheets, H.R., Carbon	5.145	Nails, Wire, 8d Common	8.595
Sheets, C.R., Carbon	6.214	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.690	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	Jan. 4 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	208.90	208.90	208.90	194.53	167.89
Index in cents per lb	5.659	5.659	5.659	5.270	4.548

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$127.68	$127.68	$127.95	$117.95	$103.50
No. 2 Fdry, Pig Iron, GT	58.99	58.99	58.99	56.54	52.54
Basic Pig Iron, GT	58.49	58.49	58.49	56.04	52.16
Malleable Pig Iron, GT	59.77	59.77	59.77	57.27	53.27
Steelmaking Scrap, GT	52.17	51.83	48.83	34.50	45.50

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.
†Revised.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Jan. 4 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.70
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.70
Bars, H.R., deld. Philadelphia	4.90	4.90	4.90	4.55	4.18
Bars, C.F., Pittsburgh	5.90	5.90	5.90	5.40	4.55
Shapes, Std., Pittsburgh	4.60	4.60	4.60	4.25	3.65
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.65
Shapes, deld., Philadelphia	4.88	4.88	4.88	4.53	3.90
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.70
Plates, Chicago	4.50	4.50	4.50	4.225	3.70
Plates, Coatesville, Pa.	4.80	4.80	4.80	4.225	4.15
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.70
Plates, Claymont, Del.	4.80	4.80	4.80	4.225	4.15
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.60-3.75
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.60
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.55
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.80
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.75-4.00
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.50
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75	4.65-5.35
Strip, C.R., Chicago	6.25-6.35	6.25-6.35	6.35	5.85	4.50-4.90
Strip, C.R., Detroit	6.35	6.35	6.35	5.90	4.35-5.60
Wire, Basic, Pittsburgh	6.25	6.25	6.25	5.75	4.85-5.10
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.45	$9.45	$9.45	$9.05	$8.70

SEMIFINISHED STEEL					
Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$66.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	5.025	5.025	5.025	4.675	4.10-4.30

PIG IRON, Gross Ton					
Bessemer, Pitts.	$59.50	$59.50	$59.50	$57.00	$53.00
Basic, Valley	58.50	58.50	58.50	56.00	52.00
Basic, deld. Phila.	62.16	62.16	62.16	59.66	56.39
No. 2 Fdry, Pitts.	59.00	59.00	59.00	56.50	52.50
No. 2 Fdry, Chicago	59.00	59.00	59.00	56.50	52.50
No. 2 Fdry, Valley	59.00	59.00	59.00	56.50	52.50
No. 2 Fdry, deld. Phila.	62.66	62.66	62.66	55.16	56.89
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	48.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.58	55.58
Malleable, Valley	59.00	59.00	59.00	56.50	52.50
Malleable, Chicago	59.00	59.00	59.00	56.50	52.50
Ferromanganese, Duquesne	205.00†	190.00†	190.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$51.00	$51.00	$47.50	$32.50	$46.50
No. 1 Heavy Melt, E. Pa.	55.00	55.00	50.00	32.00	45.00
No. 1 Heavy Melt, Chicago	50.50	49.50	49.50	35.00	45.00
No. 1 Heavy Melt, Valley	57.50	52.50	52.50	34.50	46.25
No. 1 Heavy Melt, Cleve.	54.50	51.50	49.50	33.00	45.75
No. 1 Heavy Melt, Buffalo	45.50	45.50	43.50	30.50	44.88
Rails, Rerolling, Chicago	72.50	71.00	73.50	53.00	67.00
No. 1 Cast, Chicago	51.50	50.50	49.50	40.00	63.00

COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.125	$14.125	$13.625	$13.75	$14.75
Beehive, Fdry, Connlsvl.	16.50	16.50	16.50	16.75	17.50
Oven, Fdry, Chicago	25.75	25.75	25.75	24.50	21.00

Daily Nonferrous Price Record

	Price Jan. 4	Last Change	Previous Price	Dec. Avg.	Nov. Avg.	Jan. 1955 Avg.
Copper	43.00-50.25	Dec. 29, 1955	43.00-50.00	46.053	44.420	30.180
Lead	16.30	Jan. 4, 1956	15.80	15.358	15.300	14.800
Zinc	13.00	Oct. 21, 1955	13.00-13.50	13.000	13.000	11.500
Tin	109.25	Jan. 4, 1956	108.50	107.98	97.825	87.280
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	64.500
Aluminum	24.40	Aug. 8, 1955	23.20-24.40	24.400	24.400	22.900
Magnesium	32.50	Aug. 16, 1955	28.50	32.500	32.500	27.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.** Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.** Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.** Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.** Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

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Nonferrous Metals

Copper men continue to point out that there will be more of the red metal in '56. Lead starts out the new year with a price increase and waits for zinc to follow

Nonferrous Metal Prices, Pages 94 & 95

COPPER SUPPLIES, reports the Department of Commerce, will come into balance during the second quarter of this year. One reason: New production should add some 7000 tons a month to domestic supply during the second quarter of '56 (see page 32).

But even the Commerce department's year-end survey hedges. Certain producers of refined copper, explains the survey, are obligated to deliver about 18,000 tons of the red metal to government stockpile by June 30, 1956. This amount was deferred during the final quarter of 1954 and the first two quarters of '55.

Strike—There is little hope for any improvement during the first quarter. Chilean mine production (about 40,000 tons a month) has been shut down for three weeks. And the Chilean copper laws are being kicked around like a political football. The Chilean Senate's Constitution & Justice Commission has upheld the statute of the May Copper Law, covering wage and working conditions for mine employees, and now has passed the ball to the Chilean Senate for consideration. While most observers feel that the Senate will approve the action of the commission, few will even hazard a guess as to when the miners will return to work, it could be today or three weeks from now.

Aluminum Roundup

Sales of aluminum building materials will increase about 25 per cent this year, predicts Frank R. Nichols, president, Nichols Wire & Aluminum Co.

This will happen despite the forecasts of fewer building starts and the fact that aluminum ingot production is expected to rise only 18 per cent.

In 1955, reports Mr. Nichols, aluminum building materials climbed to first place among consumers of primary aluminum, taking 19 per cent of the total.

The reduction in building starts, he explains, will be more than counterbalanced by the sharp increase in the amount of aluminum building products being used per house or industrial structure.

Primary producers continue to harvest new sales gains. Kaiser Aluminum & Chemical Corp. reports that its net earnings for the second quarter (ending Nov. 30) reached $9.1 million. Earnings during the corresponding period in 1954 were only $6.4 million.

STEEL's Metal Price Averages for Dec., 1955

(Cents per lb)

Electrolytic Copper, deld. Connecticut	46.053
Lead, St. Louis	15.358
Prime Western Zinc, E. St. Louis, Ill.	13.000
Straits Tin, New York	107.98
Primary Aluminum Ingots, deld.	24.400
Magnesium, Freeport, Tex.	32.500
Nickel, f.o.b. refinery	64.500

U.S. Abandons Zirconium

The Government is stepping out of the zirconium business. The Bureau of Mines will continue to do research on zirconium, but all production is being turned over to private enterprise.

The Bureau of Mines, which acted as the pioneer in the development of a zirconium program, reports that private industry now has sufficient production. The bureau's factory will be placed on stand-by. At this time, zirconium has valuable properties as a construction material in the nuclear energy field. The bureau will continue to look for new uses.

Lead Prices Rise: Zinc Next

Pressed by rising prices on the London Metal Exchange, St. Joseph Lead Co. raised the price of lead to 16 cents a pound. Other sellers quickly followed, with ½-cent-a-pound increases.

Two facts stood out: 1. The demand for lead is good. And domestic producers knew that there would be little or no resistance to a small price hike. 2. The rising price on the LME would have attracted Mexican lead in the near future if the domestic price had stayed at the 15½-cent-a-pound level. As the U. S. is dependent on Mexican lead to maintain a balance between supply and demand, it was no surprise that a moderate price rise was initiated.

Then it happened. The new price was not even firmly in people's minds when the price jumped to 16½ cents per pound on Wednesday (Jan. 4). Cause: Most pointed to the LME rising lead price and explained that if London was determined to get lead away from the U.S., domestic producers could keep raising prices, too. Zinc will follow with at least a ½-cent-a-pound increase.

Titanium Gets Competitive

Titanium made significant strides toward becoming a competitive metal last year.

Examples: 1. The price was slashed on Apr. 1, 1955, by 55 cents. This reduced the price to $3.95 per pound. Mill products were reduced from $1 to $3 per pound at this time. 2. On Nov. 1, the price of sponge was further reduced by 20 cents a pound. 3. On Nov. 23, another 30 cents was dropped, bringing the market price to $3.45 a pound. Various mill products were reduced from 80 cents to $3.50 a pound. Final tally: Sponge price decline averaged some 23 per cent for the year; finished mill products were reduced by about 19 per cent. "Such dramatic changes in just 12 months," says the Titanium Corp. of America, "point to the industry's conviction that titanium is well on its way to a competitive price relationship with the other three (steel, aluminum and magnesium) structural metals."

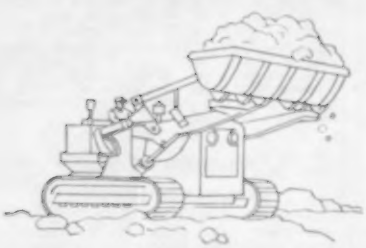
Market Memos

- The Commerce department's year-end survey reports that nickel will remain in tight supply. This will limit the production of nickel-bearing alloys, including stainless steel.
- Reynolds Metals Co. is embarking on a $15-million financing program. The plan, which includes the issuing of preferred stock, will provide Reynolds with the money to construct the company's seventh aluminum reduction plant.
- Directors of Aluminum Co. of America have voted an increased quarterly dividend (from 25 to 30 cents on common stock).

Newport Steel

HELPS MOVE THE EARTH

With power and imagination men reshape the surface of the earth, for better highways, airports, building locations and other utilization of the land. And there you find earth-moving equipment containing products of Newport Steel, the customers' mill at Newport, Kentucky. Well-trained personnel with new facilities and methods make ever better steel, to customer specifications, right here in the heart of the nation's greatest industrial development. In Newport's output are grades of steel suited to an infinite number of uses. Consider them for your own purposes.



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PRODUCTS OF NEWPORT STEEL

- Cold-Rolled Sheets
- Hot-Rolled Steel in Coil
- Hot-Rolled Pickled Steel in Coil
- Hot-Rolled Sheets
- Hot-Rolled Pickled Sheets
- Galvanized Sheets
- Galvannealed Sheets
- Colorbond Sheets
- Electrical Sheets
- Alloy Sheets and Plates
- Electric Weld Line Pipe
- Roofing and Siding
- Eave Trough and Conductor Pipe
- Culverts

Newport Steel CORPORATION

NEWPORT, KENTUCKY

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Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 24.40, pigs 22.50, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.20; No. 43, 5% Si, 26.00; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 28.20; No. 195, 4.5% Cu, 0.8% Si, 27.60; No. 214, 3.8% Mg, 27.80; No. 356, 7% Si, 0.3% Mg, 26.20.

Antimony: R.M.M. brand, 99.5%, 33.00, Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 43.00 deld. Conn. Valley; 43.00 deld. Midwest: custom smelters, 50.00-50.25 deld.; Lake, 43.00 deld.; Fire refined, 42.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$120 nom, per troy oz.

Lead: Common, 16.30, chemical, 16.40, corroding, 16.40, St. Louis, New York basis, add 0.20.

Lithium: 99% +, cups or ingot, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: 99.8% self-palletizing pig, 32.50; notched ingot, 32.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, G, H and R, 36.00; AZ91B, 31.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $280-$284 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.35 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom, per troy oz.

Palladium: $22-$24 per troy oz.

Platinum: $97-$117 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $9-$10 per lb.

Silver: Open market, 90.50 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 109.25; prompt, 108.875.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.45, grade A-2 (0.5% Fe max), $3.15 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced $5.00. Treated ingots, $6.70.

Zinc: Prime Western, 13.00; brass special, 13.25; intermediate, 13.50, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.35; special high grade 14.75, deld. Diecasting alloy ingot No. 3, 17.50; No. 2, 18.50; No. 5, 18.00, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $7.50-$10.00 per lb, depending on quantity; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 33.00-34.75; No. 12 foundry alloy (No. 2 grade) 32.00-32.25; 5% silicon alloy, 0.60 Cu max, 33.50-33.75; 13 alloy, 0.60 Cu max, 33.50-33.75; 195 alloy, 33.50-33.75; 108 alloy 32.00. Steel deoxidizing grades notch bars, granulated or shot: Grade 1, 31.50-32.75; grade 2, 30.50-31.75; grade 3, 30.00-31.00; grade 4, 29.25-30.50.

Brass Ingot: Red brass No. 115, 42.00; tin bronze No. 225, 56.00; No. 245, 48.75; high-leaded tin bronze No. 395, 45.75; No. 1 yellow No. 405, 33.25; manganese bronze No. 421, 37.75.

Magnesium Alloy Ingot: AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.84; rod, bar, wire, $1.81.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 48.35; 30,000-lb lots 48.88; l.c.l., 48.98. Weatherproof, 100,000-lb lots, 46.03; 30,000-lb lots, 46.28; l.c.l. 46.78. Magnetic wire deld., 15,000 lb or more, 55.52; l.c.l., 56.27.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $22.00 per cwt; pipe, full coils, $22.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $13.10-$13.60; sheared mill plate, $10.50-$12.00; strip, $13.10-$13.60; wire, $9.50-$11.50; forging billets, $7.90-$8.15; hot-rolled and forged bars, $7.90-$8.15.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 20.50; plates 19.50-22.25.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R.	87	74	93
Seamless Tubes	122	110	153
Shot, Blocks	...	71	...

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	67.9	66.4	...	...
0.156-0.172	57.5	55.9	...	...
0.188	57.5	55.9	...	71.7
0.219-0.234	54.5	52.9	...	...
0.250-0.281	54.5	52.9	...	68.4
0.313	54.5	52.9	...	65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1	...	52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9	...	...
1.625-2.000	48.2	46.2	...	50.5
2.125-2.500	47.0	45.0	...	...
2.563-3.375	45.6	43.6	...	...

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	37.5	42.3	...	...
0.135-0.096	38.0	43.2	...	...
0.095-0.077	38.7	44.2	36.1	41.3
0.076-0.061	39.3	45.1	36.3	41.5
0.060-0.048	39.9	45.6	36.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.030	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0	...	39.4	45.4
0.016-0.015	43.9	...	40.2	46.6
0.014	44.9	...	41.2	47.9
0.013-0.012	46.1	...	41.9	48.9
0.011	47.1	...	43.1	50.8
0.010-0.0095	48.4	...	44.3	52.2
0.009-0.0085	49.7	...	45.8	54.3
0.008-0.0075	51.3	...	47.0	56.1
0.007	52.8	...	48.5	58.4
0.006	54.4	...	49.9	63.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 lengths.

ALUMINUM

Forging Stock: Round, Class 1, 39.10-50.10 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: ASA Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 20,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$16.85	2	$ 51.90
1	26.50	4	143.00
1¼	35.85	6	256.70
1½	42.90	8	386.30

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032 in., 99.00; 0.064 in., 78.00; 0.125 in., 63.50, 30,000 lb and over, f.o.b. mill.

Plate: AZ31, 61.00, 30,000 lb or more, 0.250 in. and over, widths 24-60 in., lengths 72-180 in., treat plate, 64.00, 30,000 lb or more, ¼-in. thick, widths 24-60 in., lengths 60-192 in.; tooling plate 66.00, 30,000 lb or more, 0.250-3.000 in., widths 60-72 in., lengths 72-180 in.

Extrusions: AZ31 commercial grade, rectangels, ¼ x 2 in., 64.70; 1 x 4 in., 69.50. Rod, 1 in., 61.50; 2 in., 59.00. Tubing, 1 in. OD x 0.065 in., 82.50. Angles, 1 x 1 x ⅛-in., 68.40; 2 x 2 x ⅛-in., 62.50. Channels, 5 in., 63.40. I-beams, 5 in., 62.70.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 20.00-20.50; old sheets 17.00-17.50; borings and turnings, 11.50-12.00; crankcases, 17.00-17.50; industrial castings 17.00-17.50.

Copper and Brass: No. 1 heavy copper and wire 41.50-42.00; No. 2 heavy copper and wire, 37.50-38.50; light copper, 35.50-36.00; No. 1 composition red brass 32.00-32.50; No. 1 composition turnings, 31.00-31.50; yellow

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	63.13b	60.36c	....	63.32	39.000	39.000	38.250
Yellow Brass	52.27	42.41d	52.81	55.18	28.875	28.625	26.750
Red Brass, 85%	58.09	58.03	58.63	60.90	34.250	34.000	33.500
Low Brass, 80%	56.55	56.49	57.09	59.36	32.750	32.500	32.000
Naval Brass	55.63	49.94	62.69	58.79	26.750	26.500	26.000
Com. Bronze, 90%	60.18	60.12	60.72	62.74	35.750	35.500	35.000
Nickel Silver, 10%	66.00	65.33g	66.33	....	32.500	32.250	16.250
Phos. Bronze, A, 5%	80.99	81.49	81.49	82.67	39.250	39.000	38.000
Silicon Bronze	66.54	65.73	66.58	68.68e	37.875	37.625	37.875
Manganese Bronze	59.37	53.38	63.82	....	27.000	26.750	26.000
Munts Metal	53.74	49.55	....	....	27.000	26.750	26.250

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

brass turnings, 17.50-18.00; new brass clippings, 27.50-28.00; light brass, 19.00-19.50; heavy yellow brass, 22.00-22.50; new brass rod ends, 26.00-26.50; auto radiators, unsweated, 24.50-25.00; cocks and faucets, 24.50-25.00; brass pipe 25.00-25.50.

Lead: Heavy, 12.00-13.00; battery plates, 6.50-7.25; linotype and stereotype, 13.25-14.75; electrotype, 12.00-13.00; mixed babbitt, 15.25.

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 60.00-65.00; old sheets, 55.00-65.00; turnings, 50.00; rods, 59.50-65.00.

Nickel: Sheets and clips, 100.00-150.00; rolled anodes, 100.00-150.00; turnings, 85.00-125.00; rod ends, 100.00-150.00.

Zinc: Old zinc, 5.50-6.00; new die-cast scrap, 5.00-5.75; old die-cast scrap, 3.25-3.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 25.00; 3003 clippings, 24.75-25.00; 6151 clippings, 24.50-25.00; 5052 clippings, 24.50-25.00; 2014 clippings, 24.00-24.50; 2017 clippings, 24.00-24.50; 2024 clippings, 24.00-24.50; mixed clippings, 24.00-24.50; old sheet, 20.00-22.00; old cast, 21.00-22.00; clean old cable (free of steel), 25.00; borings and turnings, 22.00-23.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 43.00-43.50; No. 2 heavy copper and wire, 41.50-42.00; light copper, 39.00-39.75; refinery brass 60% copper) per dry copper content, 39.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 43.50-44.00; No. 2 heavy copper and wire, 40.00-42.00; light copper, 38.00-39.75; No. 1 composition borings, 34.00; No. 1 composition solids, 34.50-35.00; heavy yellow brass solids, 24.00-24.50; yellow brass turnings, 22.50-23.50; radiators, 27.50-28.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 50.79, oval, 53.92, 5000-10,000 lb; electrodeposited, 54.28, 2000-5000 lb lots; cast 59.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.275; 200-499 lb, $1.260; 500-999 lb, $1.255; 1000 lb or more, $1.250.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums. **Chromic Acid:** Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 35.25; 200 lb, 34.50; 300 lb, 34.25; 400-900 lb, 35.50; 1000 lb, 31.50. **Copper Sulphate:** 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 39.50; 10,000 lb and over, 35.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 3300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 16-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 75.80; 100-600 lb, 67.00; 700-1900 lb, 64.50; 2000-9900 lb, 62.80; 10,000 lb or more, 61.60.

Stannous Chloride (anhydrous): Less than 25 lb, $1.738; 25 lb, $1.388; 100 lb, $1.238; 400 lb, $1.214; 5200-19,600 lb, $1.092; 20,000 lb or more, 97.00.

Stannous Sulphate: Less than 50 lb, $1.362; 50 lb, $1.062; 100-1900 lb, $1.042; 2000 lb or more, $1.022.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

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Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 24.40, pigs 22.50, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.20; No. 43, 5% Si, 26.00; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 28.20; No. 195, 4.5% Cu, 0.8% Si, 27.60; No. 214, 3.8% Mg, 27.80; No. 356, 7% Si, 0.3% Mg, 26.20.

Antimony: R.M.M. brand, 99.5%, 33.00, Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 43.00 deld. Conn. Valley; 43.00 deld. Midwest; custom smelters, 50.00-50.25 deld.; Lake, 43.00 deld.; Fire refined, 42.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$120 nom, per troy oz.

Lead: Common, 16.30, chemical, 16.40, corroding, 16.40, St. Louis, New York basis, add 0.20.

Lithium: 99% +, cups or ingot, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: 99.8% self-palletizing pig, 32.50; notched ingot, 32.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, G, H and R, 36.00; AZ91B, 31.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $280-$284 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.35 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom, per troy oz.

Palladium: $22-$24 per troy oz.

Platinum: $97-$117 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $9-$10 per lb.

Silver: Open market, 90.50 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 109.25; prompt, 108.875.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.45, grade A-2 (0.5% Fe max), $3.15 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced $5.00. Treated ingots, $6.70.

Zinc: Prime Western, 13.00; brass special, 13.25; intermediate, 13.50, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.35; special high grade 14.75, deld. Diecasting alloy ingot No. 3, 17.50; No. 2, 18.50; No. 5, 18.00, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $7.50-$10.00 per lb, depending on quantity; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 33.00-34.75; No. 12 foundry alloy (No. 2 grade) 32.00-32.25; 5% silicon alloy, 0.60 Cu max, 33.50-33.75; 13 alloy, 0.60 Cu max, 33.50-33.75; 195 alloy, 33.50-33.75; 108 alloy 32.00. Steel deoxidizing grades notch bars, granulated or shot: Grade 1, 31.50-32.75; grade 2, 30.50-31.75; grade 3, 30.00-31.00; grade 4, 29.25-30.50.

Brass Ingot: Red brass No. 115, 42.00; tin bronze No. 225, 56.00; No. 245, 48.75; high-leaded tin bronze No. 305, 45.75; No. 1 yellow No. 405, 33.25; manganese bronze No. 421, 37.75.

Magnesium Alloy Ingot: AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.84; rod, bar, wire, $1.81.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 48.35; 30,000-lb lots 48.88; l.c.l., 48.98. Weatherproof, 100,000-lb lots, 46.03; 30,000-lb lots, 46.28; l.c.l. 46.78. Magnetic wire deld., 15,000 lb or more, 55.52; l.c.l., 56.27.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $22.00 per cwt; pipe, full coils, $22.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $13.10-$13.60; sheared mill plate, $10.50-$12.00; strip, $13.10-$13.60; wire, $9.50-$11.50; forging billets, $7.90-$8.15; hot-rolled and forged bars, $7.90-$8.15.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 20.50; plates 19.50-22.25.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R.	87	74	93
Seamless Tubes	122	110	153
Shot, Blocks	...	71	...

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	67.9	66.4	...	...
0.156-0.172	57.5	55.9	...	...
0.188	57.5	55.9	...	71.7
0.219-0.234	54.5	52.9	...	...
0.250-0.281	54.5	52.9	...	68.4
0.313	54.5	52.9	...	65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1	...	52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9	...	...
1.625-2.000	48.2	46.2	...	50.5
2.125-2.500	47.0	45.0	...	...
2.563-3.375	45.6	43.6	...	...

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	37.5	42.3	...	...
0.135-0.096	38.0	43.2	...	...
0.095-0.077	38.7	44.2	36.1	41.3
0.076-0.061	39.3	45.1	36.3	41.5
0.060-0.048	39.9	45.6	36.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.030	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0	...	39.4	45.4
0.016-0.015	43.9	...	40.2	46.6
0.014	44.9	...	41.2	47.9
0.013-0.012	46.1	...	41.9	48.9
0.011	47.1	...	43.1	50.5
0.010-0.0095	48.4	...	44.3	52.2
0.009-0.0085	49.7	...	45.8	54.3
0.008-0.0075	51.3	...	47.0	56.1
0.007	52.8	...	48.5	58.4
0.006	54.4	...	49.9	63.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 lengths.

ALUMINUM

Forging Stock: Round, Class 1, 39.10-50.10 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: ASA Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$16.85	2	$ 51.95
1	26.50	4	143.00
1¼	35.85	6	256.70
1½	42.90	8	386.30

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032 in., 99.00; 0.064 in., 78.00; 0.125 in., 63.50, 30,000 lb and over, f.o.b. mill.

Plate: AZ31, 61.00, 30,000 lb or more, 0.250 in. and over, widths 24-60 in., lengths 72-180 in., tread plate, 64.00, 30,000 lb or more, ¼-in. thick, widths 24-60 in., lengths 60-192 in.; tooling plate 66.00, 30,000 lb or more, 0.250-3.000 in., widths 60-72 in., lengths 72-180 in.

Extrusions: AZ31 commercial grade, rectangels, ¼ x 2 in., 64.70; 1 x 4 in., 69.50. Rod, 1 in., 61.50; 2 in., 59.00. Tubing, 1 in. OD x 0.065 in., 82.50. Angles, 1 x 1 x ⅛-in., 68.40; 2 x 2 x ⅛-in., 62.50. Channels, 8 in., 63.40. I-beams, 5 in., 62.70.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 20.00-20.50; old sheets 17.00-17.50; borings and turnings, 11.50-12.00; crankcases, 17.00-17.50; industrial castings 17.00-17.50.

Copper and Brass: No. 1 heavy copper and wire 41.50-42.00; No. 2 heavy copper and wire, 37.50-38.50; light copper, 35.50-36.00; No. 1 composition red brass 32.00-32.50; No. 1 composition turnings, 31.00-31.50; yellow

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	63.13b	60.38c	....	63.32	39.000	39.000	38.250
Yellow Brass	52.27	42.41d	52.81	55.18	28.875	28.625	26.750
Red Brass, 85%	58.09	58.03	58.63	60.90	34.250	34.000	33.500
Low Brass, 80%	56.55	56.49	57.09	59.36	32.750	32.500	32.000
Naval Brass	55.63	49.94	62.69	58.79	26.750	26.500	26.000
Com. Bronze, 90%	60.18	60.12	60.72	62.74	35.750	35.500	35.000
Nickel Silver, 10%	66.00	68.33g	68.33	....	32.500	32.250	16.250
Phos. Bronze, A, 5%	80.99	81.49	81.49	82.67	39.250	39.000	38.000
Silicon Bronze	66.54	65.73	66.58	68.68e	37.875	37.625	37.875
Manganese Bronze	59.37	53.38	63.82	....	27.000	26.750	26.000
Munts Metal	53.74	49.55	....	....	27.000	26.750	26.250

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

brass turnings, 17.50-18.00; new brass clippings, 27.50-28.00; light brass, 19.00-19.50; heavy yellow brass, 22.00-22.50; new brass rod ends, 26.00-26.50; auto radiators, unsweated, 24.50-25.00; cocks and faucets, 24.50-25.00; brass pipe 25.00-25.50.

Lead: Heavy, 12.00-13.00; battery plates, 6.50-7.25; linotype and stereotype, 13.25-14.75; electrotype, 12.00-13.00; mixed babbitt, 15.25.

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 60.00-65.00; old sheets, 55.00-65.00; turnings, 50.00; rods, 59.50-65.00.

Nickel: Sheets and clips, 100.00-150.00; rolled anodes, 100.00-150.00; turnings, 85.00-125.00; rod ends, 100.00-150.00.

Zinc: Old zinc, 5.50-6.00; new die-cast scrap, 5.00-5.75; old die-cast scrap, 3.25-3.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 25.00; 3003 clippings, 24.75-25.00; 6151 clippings, 24.50-25.00; 5052 clippings, 24.50-25.00; 2014 clippings, 24.00-24.50; 2017 clippings, 24.00-24.50; 2024 clippings, 24.00-24.50; mixed clippings, 24.00-24.50; old sheet, 20.00-22.00; old cast, 21.00-22.00; clean old cable (free of steel), 25.00; borings and turnings, 22.00-23.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 43.00-43.50; No. 2 heavy copper and wire, 41.50-42.00; light copper, 39.00-39.75; refinery brass 60% copper) per dry copper content, 39.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 43.50-44.00; No. 2 heavy copper and wire, 40.00-42.00; light copper, 38.00-39.75; No. 1 composition borings, 34.00; No. 1 composition solids, 34.50-35.00; heavy yellow brass solids, 24.00-24.50; yellow brass turnings, 22.50-23.50; radiators, 27.50-28.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 59.79, oval, 58.92, 5000-10,000 lb; electrodeposited, 54.28, 2000-5000 lb lots; cast 59.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.275; 200-499 lb, $1.260; 500-999 lb, $1.255; 1000 lb or more, $1.250.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums. **Chromic Acid:** Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 85.50; 1000 lb, 81.50. **Copper Sulphate:** 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 3300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 16-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 75.80; 100-600 lb, 67.00; 700-1900 lb, 64.50; 2000-9900 lb, 62.80; 10,000 lb or more, 61.60.

Stannous Chloride (anhydrous): Less than 25 lb, $1.738; 25 lb, $1.388; 100 lb, $1.238; 400 lb, $1.214; 5200-19,600 lb, $1.092; 20,000 lb or more, $7.00.

Stannous Sulphate: Less than 50 lb, $1.362; 50 lb, $1.062; 100-1900 lb, $1.042; 2000 lb or more, $1.022.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

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Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.*
Code numbers following mill points indicate producing company. Key on page 97. Key to footnotes, Page 99.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5	$65.50

INGOTS, Alloy (NT)

Detroit R7	$69.00
Houston S5	74.00
Midland,Pa. C18	69.00
Munhall,Pa. U5	69.00

BILLETS BLOOMS & SLABS

Carbon, Rerolling (NT)

Aliquippa,Pa. J5	$68.50
Bessemer,Pa. U5	68.50
Bridgeport,Conn. N19	73.50
Buffalo R2	68.50
Clairton,Pa. U5	68.50
Ensley,Ala. T2	68.50
Fairfield,Ala. T2	68.50
Fontana,Calif. K1	76.00
Gary,Ind. U5	68.50
Johnstown,Pa. B2	68.50
Lackawanna,N.Y. B2	68.50
LoneStar,Tex. L6	74.50
Munhall,Pa. U5	68.50
Pittsburgh J5	68.50
S.Chicago,Ill R2 U5	68.50
S.Duquesne,Pa. U5	68.50
Youngstown R2	68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5	$84.50
Bessemer,Pa. U5	84.50
Bridgeport,Conn. N19	89.50
Buffalo R2	84.50
Canton,O. R2	86.50
Clairton,Pa. U5	84.50
Conshohocken,Pa. A3	89.50
Ensley,Ala. T2	84.50
Fairfield,Ala. T2	84.50
Fontana,Calif. K1	92.00
Gary,Ind. U5	84.50
Geneva,Utah C11	84.50
Houston S5	89.50
Johnstown,Pa. B2	84.50
Lackawanna,N.Y. B2	84.50
LosAngeles B3	94.00
Midland,Pa. C18	84.50
Munhall,Pa. U5	84.50
Pittsburgh J5	84.50
Seattle B3	98.00
S.Chicago R2,U5,W14	84.50
S.Duquesne,Pa. U5	84.50
S.SanFrancisco B3	94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2	$98.00
Buffalo R2	96.00
Canton,O. R2, T7	96.00
Conshohocken,Pa. A3	103.00
Detroit R7	96.00
Fontana,Calif. K1	115.00
Gary,Ind. U5	96.00
Houston S5	101.00
Ind.Harbor,Ind. Y1	96.00
Johnstown,Pa. B2	96.00
Lackawanna,N.Y. B2	96.00
LosAngeles B3	116.00
Massillon,O. R2	96.00
Midland,Pa. C18	96.00
Munhall,Pa. U5	96.00
S.Chicago R2,U5,W14	96.00
S.Duquesne,Pa. U5	96.00
Struthers,O. Y1	96.00
Warren,O. C17	96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2	$103.50
Canton,O. R2	103.50
Cleveland R2	103.50
Gary,Ind. U5	103.50
S.Chicago R2,W14	103.50
S.Duquesne,Pa. U5	103.50

SKELP

Aliquippa,Pa. J5	4.325
LoneStar,Tex. L6	4.625
Munhall,Pa. U5	4.225
SparrowsPoint,Md. B2	4.225
Warren,O. R2	4.225
YoungstownR2, U5	4.225

WIRE RODS

AlabamaCity,Ala. R2	5.025
Aliquippa,Pa. J5	5.025
Alton,Ill L1	5.20
Buffalo B11, W12	5.025
Cleveland A7	5.025
Donora,Pa. A7	5.025
Fairfield,Ala. T2	5.025
Houston S5	5.275
IndianaHarbor,Ind. Y1	5.025
Johnstown,Pa. B2	5.025
Joliet,Ill. A7	5.025
KansasCity,Mo. S5	5.275
Kokomo,Ind. C16	5.125
LosAngeles B3	5.825
Minnequa,Colo. C10	5.275
Monessen,Pa. P7	5.025
N.Tonawanda,N.Y. B11	5.025
Pittsburg,Calif. C11	5.675
Portsmouth,O. P12	5.025
Roebling,N.J. R5	5.125
S.Chicago,Ill R2	5.025
SparrowsPoint,Md. B2	5.125
Sterling,Ill.(1) N15	5.025
Sterling,Ill. N15	5.125
Struthers,O. Y1	5.025
Worcester,Mass. A7	5.325

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2	4.60
Aliquippa,Pa. J5	4.60
Bessemer,Ala. T2	4.60
Bethlehem,Pa. B2	4.65
Birmingham C15	5.10
Clairton,Pa. U5	4.60
Fairfield,Ala. T2	4.60
Fontana,Calif. K1	5.25
Gary,Ind. U5	4.60
Geneva,Utah C11	4.60
Houston S5	4.70
Ind.Harbor,Ind. I-2	4.60
Johnstown,Pa. B2	4.65
KansasCity, Mo. S5	4.70
Lackawanna,N.Y. B2	4.65
LosAngeles B3	5.30
Minnequa,Colo. C10	4.90
Munhall,Pa. U5	4.60
Niles,Calif. P1	5.25
Portland,Oreg. O4	5.35
Phoenixville,Pa. P4	5.15
Seattle B3	5.35
S.Chicago U5, W14	4.60
S.SanFrancisco B3	5.25
Torrance,Calif. C11	5.30
Weirton,W.Va. W6	4.60

Wide Flange

Bethlehem,Pa. B2	4.65
Clairton,Pa. U5	4.60
Fontana,Calif. K1	5.40
Lackawanna,N.Y. B2	4.65
Munhall,Pa. U5	4.60
Phoenixville,Pa. P4	5.15
S.Chicago,Ill. U5	4.60

Alloy Std. Shapes

Clairton,Pa. U5	5.65
Fontana,Calif. K1	7.30
Gary,Ind. U5	5.65
Houston S5	5.75
Munhall,Pa. U5	5.65
S.Chicago,Ill. U5	5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5	6.75
Bessemer,Ala. T2	6.75
Bethlehem,Pa. B2	6.80
Clairton,Pa. U5	6.75
Fairfield,Ala. T2	6.75
Fontana,Calif. K1	7.40
Gary,Ind. U5	6.75
Geneva,Utah C11	6.75
Houston S5	6.85
Ind.Harbor,Ind. I-2, Y1	6.75
Johnstown,Pa. B2	6.80
KansasCity,Mo. S5	6.85
Lackawanna,N.Y. B2	6.80
LosAngeles B3	7.45
Munhall,Pa. U5	6.75
Seattle B3	7.50
S.Chicago,Ill. U5, W14	6.75
S.SanFrancisco B3	7.40
Struthers,O. Y1	6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2	6.80
Lackawanna,N.Y. B2	6.80
Munhall,Pa. U5	6.75
S.Chicago,Ill U5	6.75

PILING

BEARING PILES

Bethlehem,Pa. B2	4.65
Lackawanna,N.Y. B2	4.65
Munhall,Pa. U5	4.60
S.Chicago,Ill. U5	4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2	5.45
Lackawanna,N.Y. B2	5.45
Munhall,Pa. U5	5.45
S.Chicago,Ill. U5	5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Ashland,Ky.(15) A10	4.50
Bessemer,Ala. T2	4.50
Bridgeport,Conn. N19	4.75
Buffalo R2	4.50
Clairton,Pa. U5	4.50
Claymont,Del. C22	4.80
Cleveland J5, R2	4.60
Coatesville,Pa. L7	4.80
Conshohocken,Pa. A3	4.50
Detroit M1	4.60
Ecorse,Mich. G5	4.60
Fairfield,Ala. T2	4.50
Fontana,Calif.(30) K1	5.15
Gary,Ind. U5	4.50
Geneva,Utah C11	4.50
GraniteCity,Ill. G4	4.70
Harrisburg,Pa. P4	5.10
Houston S5	4.60
Ind.Harbor,Ind. I-2, Y1	4.50
Johnstown,Pa. B2	4.50
Lackawanna,N.Y. B2	4.50
LoneStar,Tex. L6	4.85
Mansfield,O. E6	4.50
Minnequa,Colo. C10	5.35
Munhall,Pa. U5	4.50
Newport,Ky. N9	4.50
Pittsburgh J5	4.50
Riverdale,Ill. A1	4.725
Seattle B3	5.40
Sharon,Pa. S3	4.50
S.Chicago R2, U5, W14	4.50
SparrowsPoint,Md. B2	4.50
Steubenville,O. W10	4.50
Warren,O. R2	4.50
Weirton,W.Va. W6	4.50
Youngstown R2, U5, Y1	4.50

PLATES, Carbon Abras. Resist.

Claymont,Del. C22	5.65
Fontana,Calif. K1	6.30
Geneva,Utah C11	5.65
Johnstown Pa. B2	5.65
SparrowsPoint,Md. B2	5.65

PLATES, Wrought Iron

Economy,Pa. B14	10.40

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5	6.725
Bessemer,Ala. T2	6.725
Clairton,Pa. U5	6.725
Cleveland J5, R2	6.725
Claymont,Del. C22	6.725
Coatesville,Pa L7	7.025
Conshohocken,Pa. A3	6.725
Ecorse,Mich. G5	6.825
Fairfield,Ala. T2	6.725
Fontana,Calif.(30) K1	7.375
Gary,Ind. U5	6.725
Geneva,Utah C11	6.725
Houston S5	6.825
Ind.Harbor,Ind. I-2, Y1	6.725
Johnstown,Pa. B2	6.725
Munhall,Pa. U5	6.725
Pittsburgh J5	6.725
Seattle B3	7.625
Sharon,Pa. S3	6.725
S.Chicago Ill. U5, W14	6.725
SparrowsPoint,Md. B2	6.725
Youngstown U5, Y1	6.725

PLATES, Alloy

Bridgeport,Conn. N19	6.55
Claymont,Del. C22	6.30
Coatesville,Pa. L7	6.30
Fontana,Calif. K1	6.95
Gary,Ind. U5	6.30
Houston S5	6.40
Ind.Harbor,Ind. Y1	6.30
Johnstown,Pa. B2	6.30
Munhall,Pa. U5	6.30
Newport,Ky. N9	6.30
Seattle B3	7.20
Sharon,Pa. S3	6.30
S.Chicago,Ill. U5, W14	6.30
SparrowsPoint,Md. B2	6.30
Youngstown Y1	6.30

FLOOR PLATES

Cleveland J5	5.575
Conshohocken,Pa. A3	5.575
Harrisburg,Pa. P4	5.575
Ind.Harbor,Ind. I-2	5.575
Munhall,Pa. U5	5.575
S.Chicago,Ill. U5	5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10	4.75
Ashland l.c.l. (15) A10	5.25
Cleveland c.l R2	5.10
Warren,O. c.l. R2	5.10

BARS

BARS, Hot-Rolled Carbon

Ala.City, Ala.(9) R2	4.65
Aliquippa,Pa. J5	4.65
Alton, Ill. L1	4.85
Atlanta A11	4.85
Bessemer,Ala.(9) T2	4.65
Birmingham C15	5.15
Bridgeport,Conn. N19	4.80
Buffalo (9) R2	4.65
Canton,O. (9) R2	4.75
Clairton,Pa.(9) U5	4.65
Cleveland (9) R2	4.65
Ecorse,Mich. G5	4.75
Emeryville,Calif. J7	5.40
Fairfield,Ala.(9) T2	4.65
FairlessHills,Pa.(9) U5	4.80
Fontana,Calif. K1	5.35
Gary,Ind.(9) U5	4.65
Houston S5	4.90
Ind.Harbor,Ind. (9) I-2	4.65
Ind.Harbor Ind. Y1	4.65
Johnstown,Pa. B2	4.65
Joliet,Ill. P22	5.15
KansasCity,Mo. S5	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles B3	5.35
Massillon,O. (9) R2	4.75
Midland,Pa. C18	4.65
Milton,Pa. M18	4.65
Minnequa,Colo. C10	5.10
Niles,Calif. P1	5.35
N.Tonawanda,N.Y. B11	4.65
Pittsburg,Calif.(9) C11	5.35
Pittsburgh J5	4.65
Portland,Oreg. O4	5.40
Seattle B3, N14	5.40
S.Chicago W14	4.65
S.Chicago,Ill.(9) R2, U5	4.65
S.Duquesne,Pa.(9) U5	4.65
S.SanFran.,Calif. B3	5.40
Sterling,Ill.(1) N15	4.65
Sterling,Ill. N15	4.75
Struthers,O. Y1	4.65
Torrance,Calif.(9) C11	5.35
Warren,O. (9) R2	4.65
Weirton,W.Va. W6	4.65
Youngstown(9) R2	4.65
Youngstown(9) U5	4.65

BARS, H.R. Leaded Alloy

Warren,O. C17	6.325

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2	5.575
Bridgeport,Conn. N19	5.725
Buffalo R2	5.575
Canton,O. R2, T7	5.575
Clairton,Pa. U5	5.575
Detroit R7	5.575
Ecorse,Mich. G5	5.675
Fontana,Calif. K1	6.625
FairlessHills,Pa. U5	5.725
Gary,Ind. U5	5.575
Houston S5	5.825
Ind.Harbor Ind. I-2, Y1	5.575
Johnstown,Pa. B2	5.575
KansasCity,Mo. S5	5.825
Lackawanna,N.Y. B2	5.575
LosAngeles B3	6.625
Massillon,O. R2	5.575
Midland,Pa. C18	5.575
S.Chicago R2, U5, W14	5.575
S.Duquesne,Pa. U5	5.575
Struthers,O. Y1	5.575
Warren,O. C17	5.575
Youngstown U5	5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5	6.80
Bessemer,Ala. T2	6.80
Bethlehem,Pa B2	6.80
Clairton,Pa. U5	6.80
Cleveland R2	6.80
Ecorse,Mich. G5	6.90
Fairfield,Ala. T2	6.80
Fontana,Calif. K1	7.50
Gary,Ind. U5	6.80
Houston S5	7.05
Ind.Harb.,Ind. I-2, Y1	6.80
Johnstown,Pa. B2	6.80
KansasCity,Mo. S5	7.05
Lackawanna,N.Y. B2	6.80
LosAngeles B3	7.50
Pittsburgh J5	6.80
Seattle B3	7.55
S. Chicago W14	6.80
S.Duquesne,Pa. U5	6.80
S.SanFrancisco B3	7.55
Struthers,O. Y1	6.80
Warren,O. R2	6.80
Youngstown U5	6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2	4.80

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5	4.65
Atlanta A11	4.85
Fontana,Calif. K1	5.35
Joliet,Ill. P22	5.10
Niles,Calif. P1	5.35
Pittsburgh J5	4.65
Portland,Oreg. O4	5.40
SanFrancisco S7	5.05

BAR SHAPES, Hot-rolled Alloy

Clairton,Pa. U5	5.65
Gary,Ind .U5	5.65
Houston S5	5.90
KansasCity,Mo. S5	5.90
Youngstown U5	5.65

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18	8.325
Camden,N.J. P13	8.35
Chicago W18	8.325
Cleveland C20	8.325
Monaca,Pa. S17	8.325
Newark,N.J. W18	8.50
SpringCity,Pa. K3	8.30
Warren,O. C17	8.325

BARS, Cold-Finished Carbon

Ambridge,Pa. W18	5.90
BeaverFalls,Pa. M12, R2	5.90
Buffalo B5	5.95
Camden,N.J. P13	6.35
Carnegie,Pa. C12	5.90
Chicago W18	5.90
Cleveland A7, C20	5.90
Detroit R7	5.90
Detroit B5, P17	6.10
Donora,Pa. A7	5.90
Elyria,O. W18	5.90
FranklinPark,Ill. N5	5.90
Gary,Ind. R2	5.90
GreenBay,Wis. F7	5.90
Hammond,Ind. L2, M13	5.90
Hartford,Conn. R2	6.40
Harvey,Ill. B5	5.90
LosAngeles R2, S30	7.35
Mansfield,Mass. B5	6.45
Massillon,O. R2, R8	5.90
Midland,Pa. C18	5.90
Monaca,Pa. S17	5.90
Newark,N.J. W18	6.35
NewCastle,Pa.(17) B4	5.90
Pittsburgh J5	5.90
Plymouth,Mich. P5	6.15
Putnam,Conn. W18	6.45
Readville,Mass. C14	6.45
S.Chicago,Ill. W14	5.90
SpringCity,Pa. K3	6.35
Struthers,O. Y1	5.90
Waukegan,Ill. A7	5.90
Worcester,Mass. W19	6.35
Youngstown F3, Y1	5.90

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19	5.16

BARS, Cold-Finished Alloy

Ambridge,Pa. W18	7.425
BeaverFalls,Pa. M12,R2	7.425
Bethlehem,Pa. B2	7.425
Buffalo B5	7.425
Camden,N.J. P13	7.60
Canton,O. T7	7.425
Carnegie,Pa. C12	7.425
Chicago W18	7.425
Cleveland A7, C20	7.425
Detroit R7	7.425
Detroit B5, P17	7.625
Donora,Pa. A7	7.425
Elyria,O. W8	7.425
Gary,Ind. R2	7.425
GreenBay,Wis F7	7.425
Hammond,Ind. L2, M13	7.425
Hartford,Conn. R2	7.725
Harvey,Ill. B5	7.425
Lackawanna,N.Y. B2	7.425
LosAngeles S30	9.10
Mansfield,Mass. B5	7.725
Massillon,O. R2, R8	7.425
Midland,Pa. C18	7.425
Monaca,Pa. S17	7.425
Newark,N.J. W18	7.60
Plymouth,Mich. P5	7.625
S.Chicago W14	7.425
SpringCity,Pa. K3	7.60
Struthers,O. Y1	7.425
Warren,O. C17	7.425
Waukegan,Ill. A7	7.425
Worcester,Mass. A7	7.725
Youngstown F3, Y1	7.425

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2	4.65
Atlanta A11	4.85
Birmingham C15	5.15
Buffalo R2	4.65
Cleveland R2	4.65
Ecorse,Mich. G5	4.75
Emeryville,Calif. J7	5.40
Fairfield,Ala. T2	4.65
FairlessHills,Pa. U5	4.80
Fontana,Calif. K1	5.35
Ft.Worth,Tex.(42) T4	5.10
Gary,Ind. U5	4.65
Houston S5	4.90

Ind.Harbor,Ind. I-2, Y1.4.65
Johnstown,Pa. B2 .....4.65
Joliet,Ill P22 .....5.15
KansasCity,Mo. S5 .....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 .....5.35
Milton,Pa. M18 .....4.65
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.35
Pittsburg,Calif. C11 ....5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 ....5.40
SandSprings,Okla. S5 ..5.15
Seattle B3, N14 .....5.40
S.Chicago R2 .....4.65
S.Duquesne,Pa. U5 ....4.65
S.SanFrancisco B3 ....5.40
SparrowsPoint,Md. B2 ..4.65
Sterling,Ill(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Youngstown R2, U5, Y1.4.65

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2.6.15
KansasCity,Kans. S5 ..6.45
Lackawanna,N.Y. B2 ..6.17
Marion,O. P11 .....6.15
Pittsburgh U8 .....6.17
Seattle B3, N14 .....6.60
SparrowsPt. ½-1" B2..6.15
Williamsport,Pa. S19 ..6.00

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2..4.65
ChicagoHts.(4) C2, I-2..4.65
Ft.Worth,Tex.(26) T4...5.10
Franklin,Pa. (3) F5 ....4.65
Franklin,Pa.(4) F5 ....4.65
JerseyShore,Pa.(4) J8 ..4.50
Marion,O.(3) P11 .....4.65
Moline,Ill.(3) R2 .....4.65
Tonawanda(3) B12 ....4.65
Tonawanda(4) B12 ....5.15
Williamsport,Pa.(3) S19.4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt)B14 14.65
McK.Rks. (S.R.) L5 ..11.50
McK.Rks. (D.R.) L5 ..16.00
McK.Rks.(Staybolt) L5.17.00

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 .....4.325
Allenport,Pa. P7 .....4.325
Ashland,Ky.(8) A10 ...4.325
Cleveland J5, R2 ....4.325
Conshohocken,Pa. A3 ..4.375
Detroit(8) M1 .....4.425
Dravosburg,Pa. U5 ....4.325
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
FairlessHills,Pa. U5 ...4.375
Fontana,Calif. K1 ....5.075
Gary,Ind. U5 .....4.325
Geneva,Utah C11 .....4.425
GraniteCity,Ill. G4 ....4.525
Ind.Harbor,Ind. I-2, Y1 4.325
Kokomo,Ind. C16 .....4.425
Lackawanna,N.Y. B2 ..4.325
Mansfield,O. E6, (37)..4.325
Munhall,Pa. U5 .....4.325
Newport,Ky.(8) N9 ...4.325
Niles O. M21 .....4.325
Pittsburg,Calif. C11 ...5.025
Pittsburgh J5 .....4.325
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.55
Sharon,Pa. S3 .....4.325
S.Chicago,Ill. W14 ....4.325
SparrowsPoint,Md. B2 .4.325
Steubenville,O. W10 ...4.325
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5, Y1 ..4.325

SHEETS, H.R.(19 Ga. & Lighter)

Ala.City,Ala. R2 .....5.625
Kokomo,Ind. C16 .....5.475
Niles,O. M21 .....5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 ....7.20
Youngstown Y1 .....7.20

SHEETS, H.R.(14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 .....6.375
Conshohocken,Pa. A3 ..6.425
Dravosburg,Pa. U5 ...6.375
Ecorse,Mich. G5 .....6.475
Fairfield,Ala. T2 ....6.375
FairlessHills,Pa. U5 ...6.425
Fontana,Calif. K1 ....7.125
Gary,Ind U5 .....6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 ..6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
Sharon,Pa. S3 .....6.375
S.Chicago,Ill. U5 .....6.375
SparrowsPoint(36) B2..6.375
Warren,O. R2 .....6.375
Weirton,W.Va. W6 ....6.375
Youngstown U5, Y1 ..6.375

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.575
Ind.Harbor,Ind. I-2....4.575

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 .....5.325
Cleveland J5, R2 ....5.325
Conshohocken,Pa. A3 ..5.375
Dravosburg,Pa. U5 ....5.325
Detroit M1 .....5.325
Ecorse,Mich. G5 ....5.425
Fairfield,Ala. T2 .....5.325
FairlessHills,Pa. U5 ..5.375
Follansbee,W.Va. F4 ..5.325
Fontana,Calif. K1 .....6.425
Gary,Ind. U5 .....5.325
GraniteCity,Ill. G4 ....5.525
Ind.Harbor,Ind. I-2, Y1 5.325
Lackawanna,N.Y. B2 ..5.325
Mansfield,O. E6 .....5.325
Middletown,O. A10 ....5.325
Newport,Ky. N9 .....5.325
Pittsburg,Calif. C11 ..6.275
Pittsburgh J5 .....5.325
Portsmouth,O. P12 ....5.325
SparrowsPoint,Md. B2 .5.325
Steubenville,O. W10 ...5.325
Warren,O. R2 .....5.325
Weirton,W.Va. W6 ....5.325
Youngstown Y1 .....5.325

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 .....7.875
Dravosburg,Pa. U5 ..7.875
Ecorse,Mich. G5 .....7.975
FairlessHills,Pa. U5 ..7.925
Fontana,Calif. K1 ....8.975
Gary,Ind. U5 .....7.875
IndianaHarbor,Ind. Y1.7.875
Lackawanna(37) B2 ..7.875
Pittsburgh J5 .....7.875
SparrowsPoint(33) B2..7.875
Warren,O. R2 .....7.875
Weirton,W.Va. W6 ....7.875
Youngstown Y1 .....7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 ....5.825

SHEETS, Culvert (16 Gage)	Cu	Alloy	Cu	Fe
Ashland,Ky.	A10	6.90		...
Canton,O.	R2	6.10	6.55	
Dravosburg	U5	6.10		...
Fairfield	T2	6.10		...
Gary,Ind.	U5	6.10	6.35	
Ind.Harbor	I-2	6.10	6.35	
Kokomo,Ind.	C16	6.20		...
MartinsFry.	W10	6.10		...
Newport,Ky.	N9	6.10	6.35	
Pitts.,Calif.	C11	6.85		...
SparrowsPt.	B2	6.10		...

SHEETS, Culvert—Pure Iron

Ashland,Ky A10 .....7.15
Gary,Ind. U5 .....6.35
MartinsFry.,O. W10 ....6.35

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City, Ala. R2 ....5.85‡
Ashland,Ky. A10 .....5.85†
Canton,O. R2 .....5.85‡
Dover,O. R1 .....5.85†
Dravosburg,Pa. U5 ...5.85†
Fairfield,Ala. T2 .....5.85†
Gary,Ind. U5 .....5.85*
GraniteCity,Ill. G4 ....6.05
Ind.Harbor,Ind. I-2 ...5.85†
Kokomo,Ind. C16 .....5.95‡
MartinsFerry,O. W10 ..5.85*
Middletown,O. A10 ...5.85†
Newport,Ky. N9 .....5.85‡
Pittsburg,Calif. C11 ..6.60*
SparrowsPt.,Md. B2 ..5.85†
Warren,O. R2 .....5.85†
Weirton,W.Va. W6 ...5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.575

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 .....6.60
Newport,Ky. N9 .....6.25

SHEETS,Galvanized Ingot Iron
(Hot-dipped Continuous)

Ashland,Ky. A10 .....6.10
Middletown,O. A10 .....6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.70
Niles,O.(28) R2 .....6.70
Weirton,W.Va. W6 ....6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .8.50
Butler,Pa. A10 (type 2) .8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 .....5.90
Cleveland R2 .....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 .....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ...5.90
Middletown,O. A10 ....5.90
Niles,O. M21 .....5.90
Youngstown Y1 .....5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...7.75
Ind.Harbor,Ind. I-2 ...7.75
Yorkville,O. W10 .....7.75

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 .....6.25
Mansfield,O. E6 .....6.25
Middletown,O. A10 ....6.25
Niles O. M21 .....6.25
Weirton,W.Va. W6 ....6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.65

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Ingoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Division, H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.325
Allenport,Pa. P7 .....4.325
Alton,Ill. L1 .....4.50
Ashland,Ky.(8) A10 ..4.325
Atlanta A11 .....4.525
Bessemer,Ala. T2 .....4.325
Birmingham C15 .....4.825
Bridgeport,Conn. N19 ..4.625
Buffalo(27) R2 .....4.325
Conshohocken,Pa. A3 ..4.375
Detroit M1 .....4.425
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
Fontana,Calif. K1 .....5.075
Gary,Ind. U5 .....4.325
Ind.Harbor,Ind. I-2, Y1 .4.325
Johnstown,Pa.(25) B2..4.325
Lackaw'na,N.Y.(24) B2 4.325
LosAngeles(25) B3 ....5.075
Milton,Pa. M18 .....4.325
Minnequa,Colo. C10 ...5.425
NewBritain(10) S15 ...4.325
Pittsburg,Calif. C11 ...5.075
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.55
SanFrancisco S7 .....5.65
Seattle(25) B3 .....5.325
Seattle N14 .....5.40
Sharon,Pa. S3 .....4.325
S.Chicago,Ill. W14 ....4.325
S.SanFrancisco(25) B3..5.075
SparrowsPoint,Md. B2..4.325
Sterling(1) N15 .....4.325
Sterling,Ill. N15 .....4.425
Torrance,Calif. C11 ...5.075
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5 .....4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19 ..7.50
Carnegie,Pa. S18 .....7.20
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....7.20
Ind.Harbor,Ind. Y1 ....7.20
LosAngeles B3 .....8.40
Newport,Ky. N9 .....7.20
Sharon,Pa. S3 .....7.20
S.Chicago W14 .....7.20
Youngstown U5, Y1 ....7.20

STRIP, Hot-Rolled
High-Strength Low-Alloy

Bessemer,Ala. T2 .....6.425
Conshohocken,Pa. A3...6.425
Ecorse,Mich. G5 .....6.525
Fairfield,Ala. T2 .....6.425
Fontana,Calif. K1 .....7.525
Gary,Ind. U5 .....6.425
Houston S5 .....6.675
Ind.Harbor,Ind. I-2, Y1 6.425
KansasCity,Mo. S5 ....6.675
Lackawanna,N.Y. B2 ..6.425
LosAngeles(25) B3 ....7.175
Seattle(25) B3 .....7.425
Sharon,Pa. S3 .....6.425
S.SanFrancisco(25) B3..7.175
SparrowsPoint,Md. B2..6.425
Warren,O. R2 .....6.425
Weirton,W.Va. W6 .....6.425
Youngstown U5, Y1 ..6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..4.575

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....6.25
Baltimore T6 .....6.25
Boston T6 .....6.80
Buffalo S40 .....6.25
Cleveland A7, J5 .....6.25
Conshohocken,Pa. A3 ..6.30
Dearborn,Mich. D3 ....6.35
Detroit D2, M1, P20....6.35
Dover,O. G6 .....6.25
Ecorse,Mich. G5 .....6.35
Follansbee,W.Va. F4 ..6.25
Fontana,Calif. K1 ....8.00
FranklinPark,Ill. T6 ...6.35
Ind.Harbor,Ind. I-2 ....6.35
Ind.Harbor,Ind. Y1 ....6.25
Indianapolis C8 .....6.40
Lackawanna,N.Y. B2 ..6.25
LosAngeles C1 .....8.30
NewBedford,Mass. R10..6.70
NewBritain(10) S15 ....6.25
NewCastle,Pa. B4, E5..6.25
NewHaven,Conn. A7, D2 6.70
NewKensington,Pa. A6..6.25
Pawtucket,R.I. R3 ....6.90
Pawtucket,R.I. N8 ....6.80
Pittsburgh J5 .....6.25
Riverdale,Ill. A1 .....6.35
Rome,N.Y.(32) R6 ....6.25
Sharon,Pa. S3 .....6.25
SparrowsPt.,Md. B2 ....6.25
Trenton,N.J.(31) R5 ...7.80
Wallingford,Conn. W2 ..6.70
Warren,O. R2, T5 .....6.25
Weirton,W.Va. W6 ....6.25
Worcester,Mass. A7 ....6.80
Youngstown C8, Y1 ....6.25

STRIP, Cold-Rolled Alloy

Boston T6 .....13.80
Carnegie,Pa. S18 .....13.45
Cleveland A7 .....13.45
Dover,O. G6 .....13.45
FranklinPark,Ill. T6 ..13.45
Harrison,N.J. C18 ....13.45
Indianapolis C8 .....13.60
Pawtucket,R.I. N8 ....13.80
Sharon,Pa. S3 .....13.45
Worcester,Mass. A7 ...13.75
Youngstown C8 .....13.45

STRIP, Cold-Rolled
High-Strength Low-Alloy

Cleveland A7 .....9.10
Dearborn,Mich. D3 ....9.20
Dover,O. G6 .....9.30
Ecorse,Mich. G5 .....9.20
Ind.Harbor,Ind. Y1 ....9.30

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.30	9.25	10.80	12.95	15.65
Boston T6	7.55	9.25	10.80	12.95	15.65
Bristol,Conn. W1	...	...	10.80	12.95	15.65
Carnegie,Pa. S18	...	*9.05*	*10.60*	*12.75*	....
Cleveland A7	7.10	9.05	10.60	12.75	15.45
Cleveland C7	...	8.95	10.50	12.65	15.35
Dearborn,Mich. D3	*7.20*	*9.15*	*10.70*	....	....
Detroit D2	*7.20*	*9.15*	*10.70*	*12.85*	....
Dover,O. G6	7.10	9.05	10.60	12.75	15.45
Follansbee,W.Va. F4	7.00	8.95	10.50**	....	....
FranklinPark,Ill. T6	7.10	8.95	10.50	12.65	15.35
Harrison,N.J. C18	...	...	10.80	12.95	15.65
Indianapolis C8	*7.25*	*9.20*	*10.60*	*12.75*	*15.45*
NewBritain,Conn.(10) S15	7.10	9.05	10.60	12.75	15.45
NewCastle,Pa. B4, E5	7.10	9.05	10.60	12.75	....
NewHaven,Conn. D2	*7.55*	*9.35*	*10.90*	*13.05*	....
NewKensington,Pa. A6	*7.10*	*9.05*	*10.60*	....	....
NewYork W3	...	9.25	10.80	12.95	15.65
Pawtucket,R.I. N8	7.55	9.25	10.80	12.95	15.35
RiversdaleIll. A1	7.20	9.05	10.60	12.75	15.45
Rome,N.Y.(32) R6	7.00	8.95	10.50	12.65	15.35
Sharon,Pa. S3	7.10	9.05	10.60	12.75	15.45
Trenton,N.J. R5	...	9.25	10.80	12.95	15.65
Wallingford,Conn. W2	7.45	9.25	10.80	12.95	15.65
Warren,O. T5	7.00	8.95	10.50	12.65	15.35
Weirton,W.Va. W6	7.10	9.05	10.60	12.75	15.45
Worcester,Mass. T6	7.55	9.25	10.80	12.95	15.65
Worcester,Mass. A7	7.65	9.35	10.90	13.05	15.75
Youngstown C8	*7.10*	*9.05*	*10.60*	*12.75*	*15.45*

**0.65 C, max.

Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	14.40	17.60	....
Buffalo W12	...	...	14.40	....	....
FranklinPark,Ill. T6	...	...	14.90	18.10	21.50
Harrison,N.J. C18	...	...	14.40	17.60	21.00
NewYork W3	...	...	14.40	17.60	21.00
Trenton,N.J. R5	...	...	14.40	17.60	21.00
Worcester,Mass. W12	...	...	14.40	....	....
Worcester,Mass. A7, T6	...	...	14.40	17.60	21.00
Youngstown C8	...	...	*15.00*	*18.35*	*22.35*

Lackawanna,N.Y. B2 ..9.10
Sharon,Pa. S3 .....9.10
SparrowsPoint,Md. B2 ..9.10
Warren,O. R2 .....9.10
Weirton,W.Va. W6 .....9.10
Youngstown Y1 .....9.30

STRIP, Electrogalvanized

Cleveland A7 .....6.25*
Dover,O. G6 .....6.25*
Riverdale,Ill. A1 .....6.35*
Youngstown C8 .....6.25*
Warren,O. T5 .....6.25*
Warren,O. B9 .....6.45*
Weirton,W.Va. W6 ....5.75*
Worcester,Mass. A7 ...6.80*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....6.55

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.05
Riverdale,Ill. A1 .....4.90
Sharon,Pa. S3 .....4.75
Youngstown U5 .....4.75

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBotton,W.Va. W10 ..	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. M21	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40*	....
IndianaHarbor,Ind. I-2 ..	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	...	10.10†	10.70†	11.70†	12.60†
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80‡	13.35‡	13.85‡	14.85‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	13.55‡
Butler,Pa. A10	....	....	17.45	17.95	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	13.55
Warren,O. R2	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. ‖Coils, ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.90	$8.15	$8.56
Dravosburg,Pa. U5	7.90	8.15	8.55
Fairfield,Ala. T2	8.00	8.25	8.65
FairlessHills,Pa. U5	8.00	8.25	8.65
Gary,Ind. U5	7.90	8.15	8.55
GraniteCity,Ill. G4	8.00	8.25	8.65
IndianaHarbor,Ind. I-2, Y1	7.90	8.15	8.55
Niles,O. R2	7.90	8.15	8.55
Pittsburg,Calif. C11	8.65	8.90	9.30
SparrowsPoint,Md. B2	8.00	8.25	8.65
Weirton,W.Va. W6	7.90	8.15	8.55
Yorkville,O. W10	7.90	8.15	8.55

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	6.675	....	....
Niles,O. R2	6.675	6.875	7.075

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.20	$9.45
Dravosburg,Pa.U5	9.20	9.45
Fairfield,Ala. T2	9.30	9.55
Fairless,Pa. U5..	9.30	9.55
Gary,Ind. U5	9.20	9.45
Ind.Har. I-2, Y1.	9.20	9.45
Pitts.,Calif. C11..	9.95	10.20
Sp.Pt.,Md. B2 ..	9.30	9.55
Weirton,W.Va. W6	9.20	9.45
Yorkville,O. W10.	9.20	9.45

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.00
Dravosburg,Pa. U5	7.00
Fairfield,Ala. T2	7.10
FairlessHills,Pa. U5	7.10
Gary,Ind. U5	7.00
GraniteCity,Ill. G4	7.10
Ind.Harbor,Ind. I-2, Y1.	7.00
Niles,O. R2	7.00
Pittsburg,Calif. C11	7.75

SparrowsPoint,Md. B2 ..	7.10
Warren,O. R2	7.00
Weirton,W.Va. W6	7.00
Yorkville,O. W10	7.00

HOLLOWARE ENAMELING
Black Plate (29 Gage)

Dravosburg,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	6.75
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES
(Special Coated; Base Box)

Dravosburg,Pa. U5 ...$8.70	
Gary,Ind. U5	8.70
Yorkville,O. W10	8.70

MANUFACTURING TERNES
(Light Coated, 6 lb; Base Box)

Yorkville,O. W10 .....$9.15	

ROOFING SHORT TERNES
(8 lb Coated; Base Box)

Gary,Ind. U5 .....$10.25	

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..6.25
Aliquippa,Pa. J5 .....6.25
Alton,Ill. L1 .....6.425
Atlanta A11 .....6.45
Bartonville,Ill. K4 .....6.35
Buffalo W12 .....6.25
Chicago W13 .....6.25
Cleveland A7 .....6.25
Crawfordsville,Ind. M8..6.35
Donora,Pa. A7 .....6.25
Duluth,Minn. A7 .....6.25
Fairfield,Ala. T2 .....6.25
Fostoria,O.(24) S1 .....6.45
Houston S5 .....6.50
Jacksonville,Fla. M8 ...6.77
Johnstown,Pa. B2 .....6.25
Joliet,Ill. A7 .....6.25
KansasCity,Mo. S5 ....6.50
Kokomo,Ind. C16 .....6.35
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.50
Monessen,Pa. P7 .....6.25
Newark 6-8 ga. I-1 ....6.90
N.Tonawanda B11 .....6.25
Palmer,Mass. W12 .....6.55
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.25
Rankin,Pa. A7 .....6.25
S.Chicago,Ill. R2 .....6.25
S.SanFrancisco C10 ....7.20
SparrowsPoint,Md. B2 ..6.35
Sterling,Ill.(1) N15 ....6.25
Sterling,Ill. N15 .....6.35
Struthers,O. Y1 .....6.25
Waukegan,Ill. A7 .....6.25
Worcester,Mass. A7 ....6.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....7.90
Alton,Ill. L1 .....8.075
Bartonville,Ill. K4 .....8.00
Buffalo W12 .....7.90
Cleveland A7 .....7.90
Donora,Pa. A7 .....7.90
Duluth,Minn. A7 .....7.90
Fostoria,O. S1 .....7.95
Johnstown,Pa. B2 .....7.90
LosAngeles B3 .....8.85
Milbury,Mass.(12) N6 ..8.20
Minnequa,Colo. C10 ....8.15
Monessen,Pa. P16 .....7.90
Muncie,Ind. I-7 .....8.10
Palmer,Mass. W12 ....8.20
Pittsburg,Calif. C11 ...8.85
Portsmouth,O. P12 .....7.90
Roebling,N.J. R5 .....8.20
S.Chicago,Ill. R2 .....7.90
S.SanFrancisco C10 ....8.85
SparrowsPt.,Md. B2 ....8.00
Struthers,O. Y1 .....7.90
Trenton,N.J. A7 .....8.20
Waukegan,Ill. A7 .....7.90
Worcester A7,J4,T6,W12.8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....7.60
Alton,Ill. L1 .....7.775
Buffalo W12 .....7.60
Cleveland A7 .....7.60
Donora,Pa. A7 .....7.60
Duluth,Minn. A7 .....7.60
Johnstown,Pa. B2 .....7.60
KansasCity,Mo. S5 ....7.85
LosAngeles B3 .....8.55
Minnequa,Colo. C10 ...7.775
Monessen,Pa. P16 .....7.60
NewHaven,Conn. A7 ...7.90
Palmer,Mass. W12 .....7.90
Pittsburg,Calif. C11 ....8.55
Portsmouth,O. P12 .....7.60
Roebling,N.J. R5 .....7.90
S.Chicago,Ill. R2 .....7.60
S.SanFrancisco C10 ....8.55
SparrowsPoint,Md. B2 .7.70
Struthers,O. Y1 .....7.60
Trenton,N.J. A7 .....7.90
Waukegan,Ill. A7 .....7.60
Worcester,Mass. A7 ....7.90

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1 .....12.725
Bartonville,Ill. K4 ....12.65
Buffalo W12 .....12.55
Chicago W13 .....12.55
Cleveland A7 .....12.55
Crawfordsville,Ind. M8.12.65
Fostoria,O. S1 .....12.55
Jacksonville,Fla. M8 ..13.08
Johnstown,Pa. B2 ....12.55
Kokomo,Ind. C16 .....12.55
Minnequa,Colo. C10 ....12.30
Monessen,Pa. P16 .....12.55
Muncie,Ind. I-7 .....12.75
Palmer,Mass. W12 .....12.85
Roebling,N.J. R5 .....12.85
S.SanFrancisco C10 ....12.90
Waukegan,Ill. A7 .....12.55
Worcester,Mass. A7,T6.12.85

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 ....10.70
Buffalo W12 .....10.70
Johnstown,Pa. B2 .....10.70
Minnequa,Colo. C10 ...10.825
Monessen,Pa. P16 .....10.70
Muncie,Ind. I-7 .....10.90
Pittsburg,Calif. C11 ...11.50
Portsmouth,O. P12 .....10.70
Roebling,N.J. R5 .....11.00
SparrowsPt.,Md. B2 ...10.80

ROPE WIRE (A)

Bartonville,Ill. K4 .....10.55
Buffalo W12 .....10.55
Fostoria,O. S1 .....10.55
Johnstown,Pa. B2 .....10.55
Monessen,Pa. P16 .....10.55
Muncie,Ind. I-7 .....10.75
Palmer,Mass. W12 .....10.85
Portsmouth,O. P12 .....10.55
Roebling,N.J. R5 .....10.85
SparrowsPt. B2 .....10.65
Struthers,O. Y1 .....10.55
Worcester,Mass. J4 ...10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Bartonville,Ill. K4	14.15
Monessen,Pa. P16	14.20
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	9.00
Baltimore T6	9.30
Buffalo W12	9.00
Cleveland A7	9.00
Crawfordsville,Ind. M8	9.00
Dover,O. G6	9.00
Fostoria,O. S1	9.00
FranklinPark,Ill. T6	9.10
Kokomo,Ind. C16	9.00
Massillon,O. R8	9.00
Milwaukee C23	9.20
Monessen,Pa. P16	9.00
Pawtucket,R.I. N8	9.30
Riverdale,Ill. A1	9.10
Rome,N.Y. R6	9.00
Trenton,N.J. R5	9.30
Worcester A7, T6, W12	9.30

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.05
Wheeling,W.Va. W10	9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$9.35
Bartonville,Ill. K4	9.45
Buffalo W12	9.35
Crawfordsville,Ind. M8	9.46
Donora,Pa. A7	9.35
Duluth,Minn. A7	9.35
Johnstown,Pa. B2	9.35
Joliet,Ill. A7	9.35
Kokomo,Ind. C16	9.45
LosAngeles B3	10.14
Minnequa,Colo. C10	9.60
Pittsburg,Calif. C11	10.13
S.Chicago,Ill. R2	9.35
SparrowsPt.,Md. B2	9.45
Sterling,Ill. N15	9.35

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$9.65
Bartonville,Ill. K4	9.75
Buffalo W12	9.60
Crawfordsville,Ind. M8	9.75
Donora,Pa. A7	9.65
Duluth,Minn. A7	9.65
Johnstown,Pa. B3	9.65
Joliet,Ill. A7	9.65
Kokomo,Ind. C16	9.75
LosAngeles B3	10.45
MinnequaColo. C10	9.90
Pittsburg,Calif. C11	10.45
S.Chicago,Ill. R2	9.65
SparrowsPt.,Md. B2	9.75
Sterling,Ill. N15	9.65

Coil No. 6500 Interim	
AlabamaCity,Ala. R2	$9.70
Bartonville,Ill. K4	9.80
Buffalo W12	9.70
Crawfordsville,Ind. M8	9.80
Donora,Pa. A7	9.70
Duluth,Minn. A7	9.70
Johnstown,Pa. B2	9.70
Joliet,Ill. A7	9.70
Kokomo,Ind. C16	9.80
LosAngeles B3	10.50
Minnequa,Colo. C10	9.95
Pittsburg,Calif. C11	10.50
S.Chicago,Ill. R2	9.70
SparrowsPt.,Md. B2	9.80
Sterling,Ill. N15	9.70

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	175**
Aliquippa J5	172‖
Atlanta A11	181
Bartonville,Ill. K4	181
Crawfordsville,Ind. M8	181
Donora,Pa. A7	175†
Duluth,Minn. A7	175†
Fairfield,Ala. T2	175†
Houston,Tex. S5	180†
Johnstown,Pa. B2	179*
Joliet,Ill. A7	175†
KansasCity,Mo. S5	180†
Kokomo,Ind. C16	177†
Minnequa,Colo. C10	180**
Monessen,Pa. P7	178††
Pittsburg,Calif. C11	195†
Rankin,Pa. A7	175†
S.Chicago,Ill. R2	175**
S.SanFrancisco C10	195**
SparrowsPoint,Md. B2	181*
Sterling,Ill.(1) N15	179††

WOVEN Fence, 9-15 ga. Col.

Ala.City,Ala. R2	162**
Ala.City, 17 ga. R2	257**
Ala.City, 18 ga. R2	267**
Aliq'ppa,Pa.9-14½ga J5	165‖
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. M8	168
Donora,Pa. A7	162†
Duluth,Minn. A7	162†
Fairfield,Ala. T2	162†
Houston,Tex. S5	167†
Johnstown,Pa.(43) B2	166
Joliet,Ill. A7	162†
KansasCity,Mo. S5	167†
Kokomo,Ind. C16	164†
Minnequa,Colo. C10	167**
Monessen,Pa. 9 ga. P17	166††
Pittsburg,Calif. C11	183†
Rankin,Pa. A7	162†
S.Chicago,Ill. R2	162**
Sterling,Ill.(1) N15	168††

	An'ld	Galv.
Wire (16 Gage)	Stone	Stone
Ala.City R2	14.50	16.05**
Bartonville K4	14.60	16.55
Buffalo W12	14.50	....
Cleveland A7	14.50	....
Crawf'dsville M8	14.60	16.55
Fostoria,O. S1	14.60	16.15†
Johnstown B2	14.50	16.40*
Kokomo C16	14.60	16.15†
Minnequa C10	14.75	16.45**
Palmer,MassW12	14.50	16.05*
Pitts.,Calif. C11	14.85	16.40†
S.Chicago R2	14.50	16.05**
SparrowsPt. B2	14.60	16.50*
Sterling(1) N15	14.50	16.45††
Waukegan A7	14.50	16.05†
Worcester A7	14.80	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	7.40	7.80**
Aliquippa J5	7.40	7.925‖
Atlanta A11	7.50	8.10
Bartonville(48) K4	7.50	8.10
Buffalo W12	7.40	8.80†
Cleveland A7	7.40	....
Crawfordsville M8	7.50	8.10
Donora,Pa. A7	7.40	7.80†
Duluth,Minn. A7	7.40	7.80†
Fairfield T2	7.40	7.80†
Houston,Tex. S5	7.65	8.05†
Jacks'ville,Fla.M8	7.90	8.475
Johnstown B2(48)	7.40	7.975*
Joliet,Ill. A7	7.40	7.80†
KansasCity,Mo. S5	7.65	8.05†
Kokomo C16	7.50	7.90†
LosAngeles B3	8.35	8.925*
Minnequa C10	7.65	8.05**
Monessen P7(48)	7.40	8.00††
Palmer,Mass. W12	7.70	8.10†
Pitts.,Calif. C11	8.35	8.75†
Portsmouth,O. P12	7.40	....
Rankin A7	7.40	7.80†
S.Chicago R2	7.40	7.80**
S.SanFran. C10	8.35	8.75**
SparrowsPt.B2(48)	7.50	8.075*
Stir'ling(1)(48)	N15 7.40	8.00††
Struthers,O.(48)	Y1 7.40	7.90‡
Worcester,Mass.	A7 7.70	....

*Based on 12.50c zinc; †5c zinc; ‖10c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras. ††13c zinc.

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts

Full-Size Body (cut thread)
- †½" x 6" and smaller 61
- Larger than ½" diam. and all diams. longer than 6" 55

Under-Size Body (rolled thread; not nutted):
- ⅛" x 6" and smaller. 61

†⅛" x 4" and smaller and shorter are not nutted.

NUTS

Reg. & Heavy Square Nuts, all sizes 61

H. P. Reg. & Heavy Hex Nuts:
- ⅝" & smaller 64
- ⅝" to 1⅛" incl. 63
- 1⅛" to 1½" incl. 65
- 1⅝" & larger 61

C.P. Reg. & Heavy Hex Nuts
- ⅝" & smaller 64
- ⅝" & larger 61

Semifinished & Finished Nuts
- ⅝" & smaller 66
- ⅝" & larger 63

Semifinished Slotted Reg. & Heavy Hex Nuts
- ⅝" & smaller 66
- ⅝" & larger 63

Hot Galvanized Nuts, all types
- 1⅛" & smaller 44

(On above items, add 25% for less than case quantities)

CAP SCREWS

(New Std., hexagon head, upset, packages)

Bright:

6" and shorter:
- ¼" through ½" diam. 34
- ⅝" & ¾" diam. 31
- ⅞", 1", 1" 8

Longer than 6":
- ¼" through ⅝" diam. 3
- ¾" through 1" diam. +13

High Carbon, Heat-treated:

6" and shorter:
- ¼" through ½" diam. 20
- ⅝" & ¾" diam. 16
- ⅞", 1", 1" +11

Longer than 6":
- ¼" through ⅝" diam. +23
- ¾" through 1" diam. +41

(New Std. Hexagon head, upset, bulk)

Bright:
- ½" x 6" & smaller & shorter 49
- ⅝" & ¾" diam. x 6" & shorter 48
- ⅞", 1", 1" x 6" & shorter 31

High Carbon, Heat-treated:
- ½" x 6" & smaller & shorter 41
- ⅝" x ¾" diam. & 6" & shorter 39
- ⅞", 1", 1" x 6" & shorter 20

MACHINE SCREW NUTS & STOVE BOLT NUTS (Bulk)

No. 2 to ⅜" incl., Square:
- 25,000 to 199,999 pieces 20
- 200,000 or more pieces 27

No. 2 to ⅜" incl., Hex.:
- 25,000 to 199,999 pieces 18
- 200,000 or more pieces 25

MACHINE SCREWS, SLOTTED (Bulk)

No. 2 to ¼" diam, incl.:
- 25,000 to 199,999 pieces 20
- 200,000 or more pieces 27

⅝" to ½" diam, incl.:
- 15,000 to 99,999 pieces 20
- 100,000 or more 27

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.06	20.42
1¼	13	....	24.94	20.45
1½	13	23.31	27.57	22.61
1¾	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.12	33.72
2½	12	37.73	44.63	36.60
2½	12	41.57	49.16	40.31
2¾	12	45.00	53.22	43.65
3	12	47.99	56.76	46.55

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Toe Rails All No. 2	Toe Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	....	5.65
Fairfield,Ala. T2	....	....	....	5.65
Gary,Ind. U5	4.725	4.625	4.675	....
Huntington,W.Va. W7	....	....	....	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	....
Johnstown,Pa. B2	....	....	...(16)	5.65
Lackawanna,N.Y. B2	4.725	4.625	...(16)	5.65
Minnequa,Colo. C10	4.725	4.625	....	6.15
Steelton,Pa. B2	4.725	4.625	....	....
Williamsport,Pa. S19	....	....	....	5.65

TIE PLATES

Fairfield,Ala. T2	5.625
Gary,Ind. U5	5.625
Ind.Harbor,Ind. I-2	5.625
Lackawanna,N.Y. B2	5.625
Minnequa,Colo. C10	5.625
Seattle B3	5.775
Steelton,Pa. B2	5.625
Torrance,Calif. C11	5.775

TRACK BOLTS (20) Treated

Cleveland R2	12.40
KansasCity,Mo. S5	12.40
Lebanon,Pa. B2	12.40
Minnequa,Colo. C10	12.40
Pittsburgh O3, P14	*12.90**
Seattle B3	12.90

*0.75 off for untreated

AXLES

Ind.Harbor,Ind. S13	7.25
Johnstown,Pa. B2	7.25

JOINT BARS

Bessemer,Pa. U5	5.825
Fairfield,Ala. T2	5.825
Ind.Harbor,Ind. I-2	5.825
Joliet,Ill. U5	5.825
Lackawanna,N.Y. B2	5.825
Minnequa,Colo. C10	5.825
Steelton,Pa. B2	5.825

SCREW SPIKES

Cleveland R2	11.90
Pittsburgh O3	11.90

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.90
Ind.Harbor,Ind. I-2, Y1	7.90
KansasCity,Mo. S5	7.90
Lebanon,Pa. B2	7.90
Minnequa,Colo. C10	7.90
Pittsburgh J5	7.90
Seattle B3	8.40
S.Chicago,Ill. R2	7.90
Struthers,O. Y1	7.90
Youngstown R2	7.90

METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed.	9.25
Swedish, c.i.f. Camden, N. J., c.l. in bags.	9.50
Domestic, f.o.b. Riverton, N.J. and Niagara Falls, N. Y., in bags	9.50
Canadian, f.o.b. Shipping point	9.50
Electrolytic iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	35.50
Unannealed (99+% Fe)	34.00
Unannealed (99+% Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns.	83.00-148.00
Aluminum: Atomized, 500 lb. drum frght. allowed Carlots	34.50
Ton lots	36.50
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	35.00-50.00†
Bronze, 5000-lb lots	61.25-64.50†
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	58.75-61.50†
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc, 5000-lb lots	18.75-32.50‡

Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.30
Less than 1000 lb	4.45

Chromium, electrolytic 99.2% Cr min. 3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. ‖70% Cu, 20% Zn, 10% Ni, **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼-in. to less than 1 7/16-in.
(6) Chicago or Illrn. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Ronderized.
(29) Youngstown base.
(30) Sheared; for universal mill and 0.45c for carbon, add 0.40c for alloy and 0.45c H S.-L.A.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Ambridge, Pa. N2	6.5	..	10.5	...	13	...	14.5	...	14.5	...	14	...	16.5	...
Lorain, O. N3	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Youngstown Y1	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Alton, Ill. L1	...	...	....	....	....	....	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Benwood, W. Va. W10	16.5	+12	7.25	+18.25	+1.75	+26.25	17.5	0.25	20.5	4.75	23	7.75	25.5	7
Butler, Pa. P8	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Fairless Hills, Pa. N3	...	...	....	....	....	....	16.5	+0.75	19.5	3.75	22	6.75	24.5	8
Fontana, Calif. K1	...	...	....	....	....	....	7	+10.25	10	+6.25	12.5	+2.75	15	+1.5
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Lorain, O. N3	...	...	....	....	....	....	18.5	1.25	21.5	5.25	24	8.75	26.5	10
Sharon, Pa. S4	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	....	....	....	....	18.5	1.25	21.5	5.25	24	8.75	26.5	10
Sparrows Pt., Md. B2	15.5	+13	7	+18.5	+1.5	+26	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Youngstown R2, Y1	...	...	....	....	....	....	18.5	1.25	21.5	5.25	24	8.75	26.5	10
Wheatland, Pa. W9	17.5	+11	9	+16.5	0.5	+24	17.5	0.25	20.5	4.25	23	7.75	25.5	9

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Alton, Ill. L1	24	8	24.5	8.5	26	8.75	26	8.75	....	...	....	...
Benwood, W. Va. W10	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Etna, Pa. N2	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Fairless Hills, Pa. N3	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Fontana, Calif. K1	15.5	+0.5	16	0	17.5	0.25	17.5	0.25	8	+9.75	8	9.75
Ind. Harbor, Ind. Y1	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Lorain, O. N3	27	11	27.5	11.5	29	11.75	29	11.75	....	...	....	...
Sharon, Pa. M6	27	11	27.5	11.5	29	11.75	29	11.75	....	...	....	...
Sparrows Pt., Md. B2	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Youngstown R2, Y1	27	11	27.5	11.5	29	11.75	29	11.75	19.5	1.75	19.5	1.75
Wheatland, Pa. W9	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75

*Galvanized pipe discounts based on current price of zinc (13.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
201	17.00	21.50	....	....	31.00	....	....	42.25	39.00
202	18.25	24.00	31.00	36.25	33.50	36.75	38.75	42.50	42.50
301	17.75	22.25	....	36.75	32.00	38.00	....	44.25	41.00
302	19.00	24.75	32.00	37.25	34.50	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	41.00	....	....	....
304	20.25	26.00	33.75	39.00	37.25	40.25	43.00	47.25	47.25
304L	....	....	38.75	44.00	42.25	45.25	48.00	52.25	52.25
305	21.75	28.25	....	39.50	40.25	40.25	43.50	50.25	50.25
308	22.00	29.00	35.50	44.25	41.25	45.50	49.75	52.00	52.00
309	29.50	38.25	46.75	53.50	53.50	54.75	58.25	67.00	67.00
309S	31.50	41.00	51.00	59.00	58.50	60.25	63.75	74.00	74.00
310	37.25	48.00	62.25	72.25	68.50	73.50	75.25	78.75	78.75
314	....	....	....	....	....	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.75	63.25	65.75	69.25	73.25	73.25
317	37.25	48.25	62.75	72.75	73.50	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	45.25	49.25	54.25	54.25
18-8CbTa	29.25	38.00	45.75	52.25	53.25	53.50	58.00	66.50	66.50
403	....	....	....	28.75	32.75	....	34.00	36.25	....	44.00
405	17.50	23.00	26.75	31.00	32.25	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	31.00	....	....	....
420	23.50	30.25	31.00	36.00	37.75	37.25	40.75	58.00	55.00
430	15.25	19.75	26.00	30.00	28.75	31.00	32.25	36.75	36.75
430F	....	....	26.50	30.50	....	31.50	....	....	....
431	16.00	20.50	26.50	30.50	29.75	31.50	33.00	38.00	38.00
446	....	....	35.50	40.50	53.25	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
Stainless:			
302	....	....	30.50
304	30.30	36.05	32.50
304-L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	47.00
316-L	40.00	46.10	....
316-CB	41.15	48.45	....
321	32.00	37.75	37.25
347	34.40	41.40	48.25
405	25.80	33.35	....
410	25.30	32.85	....
430	25.30	32.85	....
Inconel	49.45	65.45	....
Nickel	41.05	55.65	....
Nickel, Low Carbon	43.25	60.05	....
Monel	42.35	56.35	....
Copper*	....	....	46.00

	Strip, Carbon Base—Cold Rolled 10%	Strip, Carbon Base—Cold Rolled Both Sides
Copper*	30.00	38.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5%Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.6775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.245
13.5	4	3	....	...	1.865
9	3.5	..	....	...	1.180
6	4	2	....	5	1.105
6	4	3	....	6	1.350
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	54.50	55.00‡	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward,Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	58.50	59.00	59.50	60.00
Tonawanda,N.Y. W12	58.50	59.00	59.50	60.00
N.Tonawanda,N.Y. T9	....	59.00	59.50	60.00
Boston, deld.	69.15	69.65	70.15	....
Rochester,N.Y. deld.	61.52	62.02	62.52	....
Syracuse,N.Y. deld.	62.62	63.12	63.62	....
Chicago District				
Chicago I-3	58.50	59.00	59.00	59.50
Gary,Ind. U5	58.50	....	59.00	....
S.Chicago R2	58.50	....	59.00	....
S.Chicago,Ill. Y1	58.50	59.00	59.00	59.50
S.Chicago,Ill. U5, W14	58.50	....	59.00	59.50
Milwaukee, deld.	60.67	61.17	61.17	61.67
Muskegon,Mich. deld.	....	65.30	65.30	....
Cleveland District				
Cleveland A7, R2	58.50	59.00	59.00	59.50
Akron,O., deld.	61.25	61.75	61.75	62.25
Lorain,O. N3	58.50	....	....	59.50
Mid-Atlantic District				
Bethlehem,Pa. B2	60.50	61.00	61.50	62.00
NewYork, deld.	....	64.78	65.28	....
Newark, deld.	63.52	64.02	64.52	65.02
Birdsboro,Pa. B10	60.50	61.00	61.50	62.00
Chester,Pa. P14	60.50	61.00	61.50	....
Philadelphia, deld.	62.16	62.66	63.16	....
Steelton,Pa. B2	60.50	61.00	61.50	62.00
Swedeland,Pa. A3	60.50	61.00	61.50	62.00
Philadelphia, deld.	62.16	62.66	63.16	63.66
Troy,N.Y. R2	60.50	61.00	61.50	62.00
Pittsburgh District				
NevilleIsland,Pa. P6	58.50	59.00	59.00	....
Pittsburgh (N&S sides), Aliquippa, deld.	....	60.37	60.37	60.87
McKeesRocks, deld.	....	60.04	60.04	60.54
Lawrenceville,Homestead, Wilmerding, Monaca, deld.	....	60.66	60.66	61.16
Verona,Trafford, deld.	60.69	61.19	61.19	61.69
Brackenridge, deld.	60.95	61.45	61.45	61.95
Bessemer,Pa. U5	58.50	....	59.00	59.50
Clairton,Rankin,S.Duquesne,Pa. U5	58.50	....	....	....
McKeesport,Pa. N3	58.50	....	....	59.50
Midland,Pa. C18	58.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	59.00	....
Sharpsville,Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield,O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie,Pa. I-3	58.50	59.00	59.00	59.50
Everett,Mass. E1	62.00	62.50	63.00	....
Fontana,Calif. K1	64.50	65.00	....	....
Geneva,Utah C11	58.50	59.00	....	....
GraniteCity,Ill. G4	60.40	60.90	61.40	....
Ironton,Utah C11	58.50	59.00	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	60.50	61.00	61.50	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

*Phos. 0.51-0.75%; $56, Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.
Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	$67.50
Buffalo H1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls, N.Y. P15	$91.00
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2)	95.50
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	98.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.50
Rockwood,Tenn. T3 (Phos. 0.0035% max)	72.50
Steelton,Pa. B2 (Phos. 0.035% max)	66.50
Philadelphia, deld.	70.05
Troy,N.Y. R2 (Phos. 0.035% max)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Pittsburgh P6 (Intermediate) (Phos. 0.036-0.075% max)	63.50

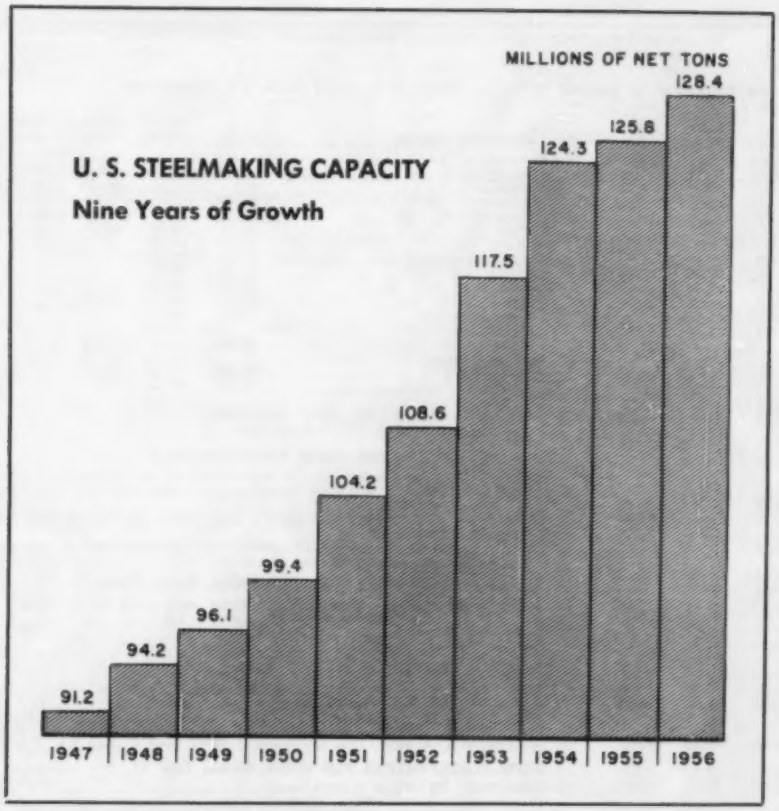
Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 25 cents per 100 lb except: Buffalo, Cleveland, Erie, 30 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Birmingham, Chattanooga, Jackson, 15 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‖	H.R. Alloy 4140††‡		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	...	7.42	9.39	....	7.63	7.49	9.48
Baltimore	7.63	8.32	8.37	....	7.65	...	7.61	8.62[9]	13.44	7.93	7.21	8.87
Birmingham	6.80	7.90	8.85	....	7.06	...	7.08	9.35	....	7.28	6.99	9.10
Boston	7.70	8.81	10.27	45.67	7.96	...	7.83	9.53	14.45	8.13	7.89	9.36
Buffalo	6.80	8.05	9.77	....	7.15	...	7.10	7.90	13.10	7.40	7.15	8.70
Chattanooga	6.95	8.10	8.60	....	7.20	...	7.20	9.13	....	7.45	7.25	9.05
Chicago	6.80	8.09	8.50	49.05	7.06	...	7.08	7.75	12.85	7.28	6.99	8.46
Cincinnati	6.92	8.08	8.90	46.10	7.30	...	7.32	8.05	13.09	7.75	7.28	8.71
Cleveland	6.80	8.09	8.85	49.16	7.16	...	7.14	7.85	12.91	7.61	7.16	8.63
Detroit	6.99	8.28	8.78	43.50	7.34	...	7.36	8.04	13.05	7.75	7.27	8.65
Erie, Pa.	6.80	7.90	8.85	....	7.15	...	7.08	7.85	....	7.40	7.15	8.63
Houston	7.85	8.75	10.49	....	8.15	...	8.25	9.85	14.00	8.20	7.80	9.20
Jackson, Miss.	7.10	8.20	9.20	....	7.40	...	7.40	9.44	....	7.60	7.45	9.30
Los Angeles	8.05	10.00	11.00	....	8.35	...	8.05	10.70	14.25	8.30	8.05	10.25
Milwaukee	6.89	8.18	8.59	....	7.15	...	7.17	7.94	12.94	7.45	7.08	8.55
Moline, Ill.	7.15	8.44	8.85	....	7.41	...	7.43	8.10	....	7.63	7.34	...
New York	7.46	8.65	9.44	44.95	8.07	...	7.96	9.48	13.28	7.99	7.76	9.19
Norfolk, Va.	7.25	...	...	....	7.65	...	7.65	9.50	....	7.95	7.45	8.95
Philadelphia	7.14	8.42	9.35	45.98	7.67	9.62	7.64	8.46	13.16	7.74	7.37	8.69**
Pittsburgh	6.80	8.09	9.26	49.00	7.16	...	7.08	7.85	12.85	7.28	6.99	8.46
Portland, Oreg.	7.80	8.80	10.65	....	8.00	...	7.95	12.20	15.00	7.85	7.75	9.60
Richmond, Va.	7.60	...	9.47	....	7.65	...	7.70	8.85	....	7.95	7.20	9.10
St. Louis	7.09	8.38	9.19	43.89	7.35	...	7.37	8.14	13.14	7.68	7.28	8.75
St. Paul	7.46	8.59	9.16	....	7.72	...	7.74	8.51	13.51	7.94	7.65	9.12
San Francisco	8.10	9.65	10.15	51.65	8.35	...	8.05	11.20	14.25[9]	8.25	8.05	10.25
Seattle	8.55	10.40	10.80	54.00	8.65	...	8.35	11.70	14.60	8.30	8.20	10.10
Spokane	8.55	11.00[7]	10.80	....	9.05	...	8.35	11.80	15.35	8.30	8.20	10.60
Washington	7.50	8.79	7.97	....	8.12	...	8.08	9.09	....	8.40	7.68	9.34

Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **¼-in. and heavier; ††as annealed; ‖‖under ½-in.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [2]—500 to 9999 lb; [4]—400 to 999 lb; [5]—4000 lb and over; [6]—1000 to 1999 lb; [8]—1000 lb and over; [7]—1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over.



Steel Steps Up Capacity

STEELMAKERS have marked up the ninth consecutive year for increasing their capacity, according to Benjamin F. Fairless, president of American Iron & Steel Institute. The new figure, as of Jan. 1, 1956, is 128,363,090 net tons of ingots and steel for castings, compared with 125,828,310 tons on Jan. 1, 1955.

The increase of 2,534,780 net tons overshadows the 1,497,900 tons recorded at the beginning of last year, but falls short of the other year-to-year gains since the end of World War II, except for 1949.

Big Steps—The institute's announcement comes in the dawn of one of the biggest expansion movements in the steel industry's history. Over the next 15 years, an average of 4 million tons capacity per year will be put in place. Added to the chart above, the pattern will resemble the staircase in a giant's castle.

This tremendous expansion is the result of two basic factors: Increasing population and increasing per capita consumption. In 1947, capacity was 91,241,250 net tons, and population was about 144 million, resulting in per capita capacity of about 1267 lb. Today, with a population of approximately 166.3 million, per capita capacity is 1540 lb. If the population reaches 200 million by 1970—and this is on the conservative side of most forecasts—per capita capacity would climb to 1884 lb.

Weekly Figure—The weekly figure, on which the institute will base its operating reports this year, is 2,461,893 net tons, compared with 2,413,278 tons last year.

Mr. Fairless said that other producing facilities in the industry have expanded or modernized to keep pace with the increase in steel production. Blast furnace capacity is up to 85,485,230 tons, an increase of 1,514,130 net tons during the year. By-product coke capacity is rated at 69,416,400 net tons, slightly better than the 1955 figure. Finishing mill capacity also has been increased.

Mallory-Sharon Buys Niles Mill

Niles Rolling Mill Division (Niles, O.) of Sharon Steel Corp. was acquired and will be operated by Mallory-Sharon Titanium Corp., Niles. The change in ownership was effective Jan. 2. The Niles plant will continue to make hot-rolled carbon, silicon, enameling iron and long terne sheets.

Semifinished Steel . . .

Semifinished Prices, Page 96

In a year-end statement, Adm. Ben Moreell, chairman, Jones & Laughlin Steel Corp., reports: "With the prospective increase in population and rising per capita uses of steel products, we will need 30 million ingot tons of new steelmaking capacity over the next ten years. One-third can be obtained by expanding existing installations. The remaining two-thirds will have to be built from the ground up."

Most unofficial and official predictions for 1956 peg production almost as strong as it was in 1955. The pattern probably will be opposite that of 1955—with greatest production in the first half and a possible decline in the second.

Production at Kaiser Steel Corp.'s Fontana, Calif., plant rose to 1,485,000 ingot tons in 1955. This was 16 per cent above 1954, Jack L. Ashby, vice president and general manager, said at the company's Oakland, Calif., headquarters.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 97 & 98

Several changes in packaging extras (effective Dec. 29) on enameling sheets have been announced by Republic Steel Corp., Cleveland. They supersede charges in effect since Mar. 10, 1954. The revised card also adds special surface inspection, outside inspection, special piling and loading to its suggested pricing sequence. The new card also notes that quantity extras do not apply on orders of 40,000 lb released for shipment at one time to one desination, and that no item quantity extra is charged on 20,000 lb and over.

Signs of a gradual slowing in automotive demand are noted. The first effects are a cutdown in conversion deals and warehouse purchasing. Sheet producers in Pittsburgh say automotive orders are "about what was expected—reflecting estimates of lower auto output this year." While total demand remains high for the first quarter, the pressure on mills to meet a terrific

demand for cold-finished sheet is lessening. Integrated mills soon hope to be in position to fill the large backlog of railroad and other orders.

Strip fabricators and buyers of hot-rolled sheet have no relief from tight supplies. Both products will remain hard to get through the first quarter. One user of strip reports hot-rolled strip orders are three or four weeks late in arriving.

The Indian Supply Mission is taking bids on 13,945 tons of galvanized sheets and has tenders on 12,000 tons of commercial quality black sheets.

Steel Bars . . .

Bar Prices, Page 96

Republic Steel Corp., Cleveland, announced changes in its hot-rolled bar pricing setup similar to those effected Dec. 23 by U. S. Steel Corp. divisions. Republic's changes were made effective Dec. 28. They involve a new special quality classification that carries a base price incorporating the 35 cents extra for quality which was added to the merchant bar price when extra properties and processing were specified by customers. Base prices on merchant quality grade remain unchanged—$4.65 per 100 lb at Republic's various plants, except those at Canton and Massillon, O., where $4.75 f.o.b. is quoted. The base price on the special quality bars is 35 cents higher than that quoted on merchant quality at all points.

U. S. Steel Export Co. followed on certain revisions in product classifications and pricing recently announced by U. S. Steel Corp. and its operating divisions. New export price bases announced are: Hot-rolled bars, special quality, $5.45; wire rods, $5.56; bright nail wire, $6.77; black annealed wire, $7.52; galvanized plain wire, $8.09. Freight is included from producing mills to New York, Philadelphia or Baltimore.

Certain bar sellers haven't opened books for March on hot-rolled carbon bars (not due to lack of demand, but to a policy to proceed on a month-to-month basis in an effort to keep commitments as current as possible). Demand far exceeds supply, with consumers pressing for faster deliveries. Some capacity is available for alloy bars, but even that isn't true of all mills.

Agricultural implement manufacturers are maintaining their demand for hot-rolled carbon bars in the Midwest. They are expected to be the big users during the first half.

In New England, the hot-rolled bar supply situation has improved slightly with Northeastern Steel Corp., Bridgeport, Conn., operating new facilities. Cold-finished bars in more standard carbon specifications and sizes are available with delivery of six to eight weeks. Most alloys are available within that period; leaded stock, in April and May.

Plates . .

Plate Prices, Page 96

Integrated mills may succeed in ending the pinch in plate supply in the third quarter. By midyear, sheet producers predict that pressure from automotive firms for cold-finished sheet will have subsided. Any decline in sheet demand will enable such firms as U. S. Steel to supply more of the plate needed by railroads and construction companies. The possibility has encouraged plate fabricators who say it's impossible to obtain all plate they need in the first quarter.

Railroad equipment manufacturers' requirements have rocketed to a point not witnessed in many years. The tight situation in plate is emphasized by the fact that there is little or no strip plate for carbuilders to draw upon—a type of plate they could readily use and obtain under normal conditions. Lack of strip plate is due to the heavy demand for the lighter and more profitable flat-rolled products.

Meanwhile, tank and line pipe work continue at a high level. Construction of heavy equipment also is taking large plate tonnages. Ship work shows improvement, although far from heading for any new peaks.

Erie Railroad has closed on five steel, diesel-electric tug boats. The contract went to the Staten Island, N. Y., yard of the Shipbuilding Division of Bethlehem Steel Co.

The Navy will close this month on initial 1956 hull plate tonnage, including large quantities of high and medium tensile grades. Bids are in at Philadelphia for the first of these contracts. Seven shipyards have estimates in for constructing seven destroyers.

Volume of new plate tonnage taking ratings is rising slightly, including fuel storage facilities at air force bases. After setasides for large sustained programs, notably railroad carbuilding, welded pipe lines and rated construction, distribution is thin.

Lukens Steel Co., Coatesville, Pa., was scheduled to get its 206-in. mill back into operation Jan. 4 after a suspension since Dec. 21 due to motor trouble. Loss of tonnage was not so great as might be supposed for the reason that the 140-in. mill, which generally is used as a breakdown mill for the larger one, was diverted to the rolling of plates.

Tin Plate . . .

Tin Plate Prices, Page 96

From all indications, tin plate consumption in 1956 will outrun the fine showing in 1955 by a good margin. Substantial gains made by container makers last year are expected to be bettered this year. Tin plate makers are fully booked through the first quarter.

Tubular Goods . . .

Tubular Goods Prices, Page 100

Mercer Pipe Division, Sawhill Tubular Products Inc., Sharon, Pa., mailed a new price card to customers. It contains changes in base discounts and prices on steel pipe. A one point higher discount is allowed on standard and extra strong pipe ⅛ through 3 in. The 5-per-cent functional discount previously extended to distributors and fabricators is withdrawn.

Most tube producers started 1956 at a much higher level of activity than at the beginning of 1955. Seamless pipe users are placing orders when they find empty space in an order book. Buttweld pipe is not booked so far in future as seamless, but producers are encouraged about the sales outlook for this year.

Merchant pipe producers expect an upturn in sales this spring. The customary seasonal decline in orders for this product hasn't materialized, and the strong selling season is yet to come.

Utilities are covering heavier than usual on seamless pipe in New England for 1956; delivery will be mostly in the second quarter as most inquiries came out too late for the first. Pipe mills are opening books for the April-June period on seamless with substantial carry-overs, despite some blanking out of one month in the first quarter. On rated tonnage, 45-day lead time is operative; considerable air base tonnage is included.

Pricing adjustments affecting distribution of standard and line buttweld pipe through jobbers—one price to all buyers—goes down hard with distributors. On direct shipments, usually larger lots, distributors still get 5 per cent, but the buyer is billed direct, producers assuming credit details. The increase on small-lot shipments, less than 1 ton per size in carlots, averages close to $10 per ton, Boston district. Buttweld is the only tubular products in the pipe category in ample supply.

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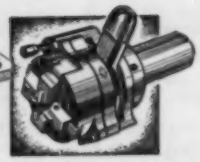

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Pig Iron . . .

Pig Iron Prices, Page 101

Blast furnace production totaled 6,698,990 net tons in November, reports the American Iron & Steel Institute. Of the total, 6,636,649 tons were pig iron; 62,341 tons, ferromanganese and spiegeleisen. In the like month of 1954, output amounted to 5,256,900 tons of which 5,204,446 tons were pig iron and 52,454 tons, ferromanganese and spiegeleisen.

Output in the first 11 months of last year amounted to 70,846,415 tons, equal to 92.2 per cent of blast furnace capacity. Of the total, 70,225,506 tons were pig iron and 620,909 tons, ferromanganese and spiegeleisen. In the like period of 1954 output was 53,100,760 tons, 70.8 per cent of capacity, and was divided: Pig iron, 52,591,818 tons; ferromanganese and spiegeleisen, 508,942 tons.

Pig iron demand is brisk. Consumers are buying more actively because of the possibility of higher prices and to step up the ratio of iron to scrap in their melting operations.

So far, scaled-down assemblies of automobiles have not been translated into softer demand for pig iron. Sellers have full order books for January and figure that if foundries, particularly automotive, operate at rates lower than originally scheduled, iron not melted will constitute a desirable inventory.

Scrap . . .

Scrap Prices, Page 106

Chicago—The New Year began with the scrap market unsettled. A mill purchased a small tonnage of No. 2 bundles at $41, up $3 over recent prices. The same consumer offered $52 for No. 1 heavy melting steel of industrial origin ($1 higher) and $53 for No. 1 factory bundles ($1 less). Prices on cast grades are generally up $1 a ton.

Cleveland—Production lists in Ohio and Michigan apparently are moving to one major Ohio consumer. These were special sales covering individual lots, and not dealer scrap. It was not ascertained whether the prices quoted were broker speculations or whether mills were buying at these prices, which would be above quoted levels. For brokers to make a profit, sales would have to be high as $62 in Youngstown and $60 in the Cleveland district.

Pittsburgh—A mill on the fringe of this district purchased No. 1 heavy melting scrap for the equivalent of $50 a ton, Pittsburgh. That mill's January needs are smaller than they were in most second-half, 1955, months. Other indicators point to a halt in upward price trends in heavy melting grades. Last reported purchases of No. 1 heavy melting by the largest consumer here were for $50.

There is little open-market buying of scrap. The only reported purchases of No. 1 heavy melting range from $50 to $52 a ton. Some emergency requests were filled at $53 a ton, according to rumors. The No. 2 heavy melting price is more nominal, but most purchases fall between $45 and $47 a ton.

New York—Brokers have advanced their buying prices on No. 2 heavy melting scrap to $46; on short shovel turnings, to $31-$32; on low phos structural and plate, to $49-$50; on heavy breakable cast, to $46-$47.

Both domestic and foreign demand is strong for open-hearth grades. Prices may go higher before turning downward, brokers believe.

Philadelphia—Following the recent sharp advance in prices for open-hearth steel scrap for the Fairless Hills Works, prices on this material are unchanged. However, the market remains strong, and there have been advances in several other items. Machine shop turnings and mixed borings and turnings are quoted at $38, delivered; short shovel turnings, $40; heavy turnings, $51; low phos structural and plate, $58-$60; couplers, springs and wheels, $59-$60; rail crops, 2 ft and under, $67.

Some leveling off may develop. But with pressure from abroad still strong and with domestic mills operating at close to capacity, there is no assurance that the peak has been reached. In the major grades of open-hearth steel, competition between exporters and domestic consumers remains keen.

Boston—Steel scrap prices are up sharply, reflecting heavy consumption in the district. Purchases of No. 1 busheling at $47, shipping point, and of No. 1 heavy melting at $47.50 were recorded. Prices paid on the basis of eastern Pennsylvania delivery are in line with recent advances in that district. The uptrend has been followed in the export market. Several grades of cast scrap are $2 to $3 a ton higher.

Cincinnati — Scrap prices here moved upward in sympathy with out-of-town price changes. Local mills are due to enter the market soon.

St. Louis—Although a comparative lull developed in the scrap market during the holidays, prices remain firm. The falloff in transactions is expected to continue this week, partly because of the annual scrap iron convention in Chicago.

It is believed the peak has been reached marketwise in this area, though scrap dealers foresee no price drops. Rail scrap is especially scarce, and brings peak prices. A new high was hit by the Wabash's sale of 1250 tons last week. The on-track quote for No. 1 railroad heavy melt remains at $55.50. Freight costs boosted the "at mills" price to a record.

Birmingham—Most grades of scrap steel advanced last week when steel mills and electric furnaces made substantial purchases in anticipation of first quarter (1956) needs. Prices paid were generally higher. No. 1 steel advanced $2 per ton; No. 2 steel and No. 2 bundles, $4 per ton. Some railroad items also advanced $1 to $2. The cast market held firm. The higher prices are bringing more scrap into dealers' yards but not in sufficient quantity to build sizable inventories.

Los Angeles—For most dealers, 1955 was a banner year—20 to 25 per cent better than 1954 when sales charts dropped to near-record lows. Only black spot in the picture was the resurgence of offshore scrap dealers, but even this competition failed to slow domestic sales perceptibly.

San Francisco—Recent floods have caused a sharp drop in steel scrap collections, but supplies on hand are ample to cover needs during the emergency.

Seattle—Steel scrap prices advanced $4 a ton last week. The market is quoted at $48 for No. 1 heavy melting, $44 for No. 2 heavy melting, $38 for No. 2 bundles, $40 for heavy breakable and $45 for No. 2 cupola.

Ferroalloys . . .

Ferroalloy Prices, Page 110

U. S. Steel Corp. raised the price of ferromanganese at its Duquesne, Pa., works, effective Jan. 1. The increase was $15 a ton, bringing the new price to $205.

Bethlehem Steel Co. had taken similar action (effective as of Dec. 24) on ferromanganese produced at its Johnstown, Pa., Works.

Warehouse . . .

Warehouse Prices, Page 101

Activity at most smaller fabricators has been slowed by year-end holidays. Customary seasonal declines in warehouse sales have developed. Dips are not occurring in plate, bars, sheet and other products having full mill order books. The

(*Please turn to page* 108)

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Jan. 4	$52.17
Dec. 28	51.83
Dec. Avg.	50.37
Jan. 1955	34.95
Jan. 1951	46.33

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	50.00-52.00
No. 2 heavy melting	*45.00-47.00*
No. 1 bundles	50.00-52.00
No. 2 bundles	*41.00-43.00*
No. 1 busheling	50.00-52.00
Machine shop turnings	32.00-33.00
Mixed borings, turnings	32.00-33.00
Short shovel turnings	36.00-37.00
Cast iron borings	36.00-37.00
Cut structurals, 3 ft lengths	*58.00-59.00*
Heavy turnings	44.00-45.00
Punchings & plate scrap	*58.00-59.00*
Electric furnace bundles	53.00-54.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Charging box cast	44.00-45.00
Heavy breakable cast	44.00-45.00
Unstripped motor blocks	32.00-33.00
No. 1 machinery cast	54.00-55.00

Railroad Scrap

No. 1 R.R. heavy melt.	55.00-56.00
Rails, 2 ft and under	67.00-68.00
Rails, 18 in. and under	68.00-69.00
Rails, random lengths	63.00-64.00
Railroad specialties	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	335.00-350.00
18-8 turnings	220.00-230.00
430 bundles & solids	100.00-110.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	*54.00-55.00*
No. 2 heavy melting	*45.00-46.00*
No. 1 bundles	*54.00-55.00*
No. 2 bundles	*42.00-43.00*
No. 2 busheling	*54.00-55.00*
Machine shop turnings	*30.00-31.00*
Mixed borings, turnings	*34.00-35.00*
Short shovel turnings	*34.00-35.00*
Cast iron borings	*34.00-35.00*
Low phos.	*55.00-56.00*
Cut structural plates 2 ft and under	*60.00-61.00*
Alloy free, short shovel turnings	*36.00-37.00*
Electric furnace bundles	*55.00-56.00*

Cast Iron Grades

No. 1 cupola	*54.00-55.00*
Charging box cast	*48.00-49.00*
Stove plate	*53.00-54.00*
Heavy breakable cast	*45.00-46.00*
Unstripped motor blocks	*38.00-39.00*
Brake shoes	*43.00-44.00*
Clean auto cast	*55.00-56.00*
Burnt cast	*43.00-44.00*
Drop broken machinery	*55.00-56.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*55.00-56.00*
R.R. malleable	59.00-60.00
Rails, 2 ft and under	71.00-72.00
Rails, 18 in. and under	72.00-73.00
Rails, random lengths	65.00-66.00
Cast steel	*60.00-61.00*
Railroad specialties	60.00-61.00
Uncut tires	*60.00-61.00*
Angles, splice bars	*66.00-67.00*
Rails, rerolling	71.00-72.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	335.00-345.00
18-8 turnings	195.00-205.00
430 clips, bundles, solids	100.00-110.00
430 turnings	50.00-60.00

YOUNGSTOWN

No. 1 heavy melting	*57.00-58.00*
No. 2 heavy melting	*48.00-49.00*
No. 1 bundles	*57.00-58.00*
No. 2 bundles	*45.00-46.00*
No. 1 busheling	*57.00-58.00*
Machine shop turnings	*33.00-34.00*
Short shovel turnings	*37.00-38.00*
Cast iron borings	*37.00-38.00*
Low phos.	*60.00-61.00*
Electric furnace bundles	*59.00-61.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*57.00-58.00*

CHICAGO

No. 1 heavy melting	*49.00-52.00*
No. 2 heavy melting	*42.00-43.00*
No. 1 factory bundles	*53.00-54.00*
No. 1 dealer bundles	*49.00-50.00*
No. 2 bundles	*40.00-41.00*
No. 1 busheling	*49.00-52.00*
Machine shop turnings	31.00-32.00
Mixed borings, turnings	33.00-34.00
Short shovel turnings	33.00-34.00
Cast iron borings	33.00-34.00
Cut structurals, 3 ft	*56.00-57.00*
Punchings & plate scrap	*57.00-58.00*

Cast Iron Grades

No. 1 cupola	*51.00-52.00*
Stove plate	*43.00-44.00*
Unstripped motor blocks	*40.00-41.00*
Clean auto cast	*56.00-57.00*
Drop broken machinery	*56.00-57.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*54.00-55.00*
R.R. malleable	61.00-62.00
Rails, 2 ft and under	*69.00-70.00*
Rails, 18 in. and under	*70.00-71.00*
Angles, splice bars	*67.00-68.00*
Rails, rerolling	*72.00-73.00*

Stainless Steel Scrap

18-8 bundles & solids	*335.00-350.00*
18-8 turnings	*240.00-250.00*
430 bundles & solids	*110.00-115.00*
430 turnings	*50.00-55.00*

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*48.00*
No. 2 heavy melting	*36.00*
No. 1 bundles	*48.00*
No. 2 bundles	*34.00*
No. 1 busheling	*48.00*
Machine shop turnings	*23.00*
Mixed borings, turnings	*23.00*
Short shovel turnings	*27.00*
Punchings & plate scrap	*55.00*

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	*37.00*
Stove plate	*37.00*
Heavy breakable	55.00
Unstripped motor blocks	*25.00*
Clean auto cast	46.00
Malleable	*42.00*

BIRMINGHAM

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	*42.00-43.00*
No. 1 bundles	*45.00-46.00*
No. 2 bundles	*34.00-35.00*
No. 1 busheling	*45.00-46.00*
Cast iron borings	*19.00-20.00*
Short shovel turnings	30.00-31.00
Machine shop turnings	29.00-30.00
Electric furnace bundles	*48.00-49.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.50-48.00
Stove plate	44.50-45.50
Bar crops and plate	*54.00-55.00*
Structural & plate, 2 ft	*53.00-54.00*
Unstripped motor blocks	39.00-40.00
Charging box cast	30.00-31.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	*51.00-52.00*
Rails, 18-in. and under	*64.00-65.00*
Rails, rerolling	64.00-65.00
Rails, random lengths	*59.00-60.00*
Angles, splice bars	*61.00-62.00*

PHILADELPHIA

No. 1 heavy melting	55.00
No. 2 heavy melting	49.00
No. 1 bundles	55.00
No. 2 bundles	46.00
No. 1 busheling	55.00
Electric furnace bundles	56.00†
Machine shop turnings	*38.00*
Mixed borings, turnings	*38.00*
Short shovel turnings	*40.00*
Heavy turnings	*51.00*
Structurals & plate	*58.00-60.00*
Couplers, springs, wheels	*59.00-60.00*
Rail crops, 2 ft & under	*67.00*

Cast Iron Grades

No. 1 cupola	*51.00-53.00*
Malleable	66.00
Heavy breakable cast	*54.00*
Drop broken machinery	57.00-58.00

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	48.00-50.00
No. 2 heavy melting	*46.00*
No. 1 bundles	48.00-50.00
No. 2 bundles	39.00-41.00
Machine shop turnings	27.00-28.00
Mixed borings, turnings	28.00-29.00
Short shovel turnings	*31.00-32.00*
Low phos. (structural & plate)	*49.00-50.00*

Cast Iron Grades

No. 1 cupola	47.00-48.00
Unstripped motor blocks	28.00-30.00
Heavy breakable	*46.00-47.00*

Stainless Steel

18-8 sheets, clips solids	320.00-325.00
18-8 borings, turnings	150.00-160.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*47.00-47.50*
No. 2 heavy melting	*39.00-40.00*
No. 1 bundles	*46.00-47.00*
No. 2 bundles	*36.50-37.50*
Machine shop turnings	*26.50-27.50*
Mixed borings, turnings	*27.50-28.00*
Short shovel turnings	*28.50-29.50*
No. 1 cast	*45.00-45.50*
Mixed cupola cast	*42.00-42.50*
No. 1 machinery cast	*47.00-47.50*

BUFFALO

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	45.00-46.00
No. 2 bundles	36.00-37.00
No. 1 busheling	45.00-46.00
Mixed borings, turnings	30.00-31.00
Machine shop turnings	28.00-29.00
Short shovel turnings	31.00-32.00
Cast iron borings	31.00-32.00
Low phos.	48.00-49.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	40.00-41.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	55.00-56.00
Rails, 3 ft and under	57.00-58.00
Railroad specialties	47.00-48.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*46.50-47.50*
No. 2 heavy melting	*40.50-41.50*
No. 1 bundles	*46.50-47.50*
No. 2 bundles	*37.00-38.00*
No. 1 busheling	*46.50-47.50*
Machine shop turnings	*30.50-31.50*
Mixed borings, turnings	*29.50-30.50*
Short shovel turnings	*33.50-34.50*
Cast iron borings	*29.50-30.50*
Low phos., 18 in.	55.00-56.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Heavy breakable cast	44.00-45.00
Charging box cast	44.00-45.00
Drop broken machinery	*55.00-56.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*53.00-54.00*
Rails, 18 in. and under	67.00-68.00
Rails, random lengths	60.00-61.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	41.50
No. 2 heavy melting	39.00
No. 1 bundles	43.00
No. 2 bundles	35.00
Machine shop turnings	28.00
Short shovel turnings	28.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	*42.00*
Heavy breakable cast	41.00
Unstripped motor blocks	40.00
Brake shoes	43.00
Clean auto cast	47.00
Stove plate	*41.00*

Railroad Scrap

No. 1 R.R. heavy melt.	55.50
Rails, 18 in. and under	67.00
Rails, random lengths	65.00
Rails, rerolling	*71.00*
Angles, splice bars	63.00

SEATTLE

No. 1 heavy melting	*48.00*
No. 2 heavy melting	*44.00*
No. 1 bundles	40.00
No. 2 bundles	*38.00*
No. 3 bundles	25.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, No. 1	55.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	50.00
Heavy breakable cast	*40.00*
No. 1 wheels	35.00
Unstripped motor blocks	33.00
Clean motor blocks	40.00
Stove plate (f.o.b. plant)	35.00
Brake shoes	35.00

Railroad Scrap

Rails, random lengths	33.00

LOS ANGELES

No. 1 heavy melting	35.00
No. 2 heavy melting	37.00
No. 1 bundles	39.00
No. 2 bundles	33.00
Machine shop turnings	18.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*48.00*

SAN FRANCISCO

No. 1 heavy melting	42.00
No. 2 heavy melting	38.00
No. 1 bundles	41.00
No. 2 bundles	37.00
No. 1 busheling	42.00
Machine shop turnings	20.00
Mixed borings, turnings	20.00
Cast iron borings	20.00
Short shovel turnings	23.00
Cut structurals	44.00
Heavy turnings	23.00
Punchings & plate scrap	42.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	35.00
Stove plate	39.00
Heavy breakable cast	36.00
Unstripped motor blocks	32.00
Brake shoes	35.00
Clean auto cast	50.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	50.00

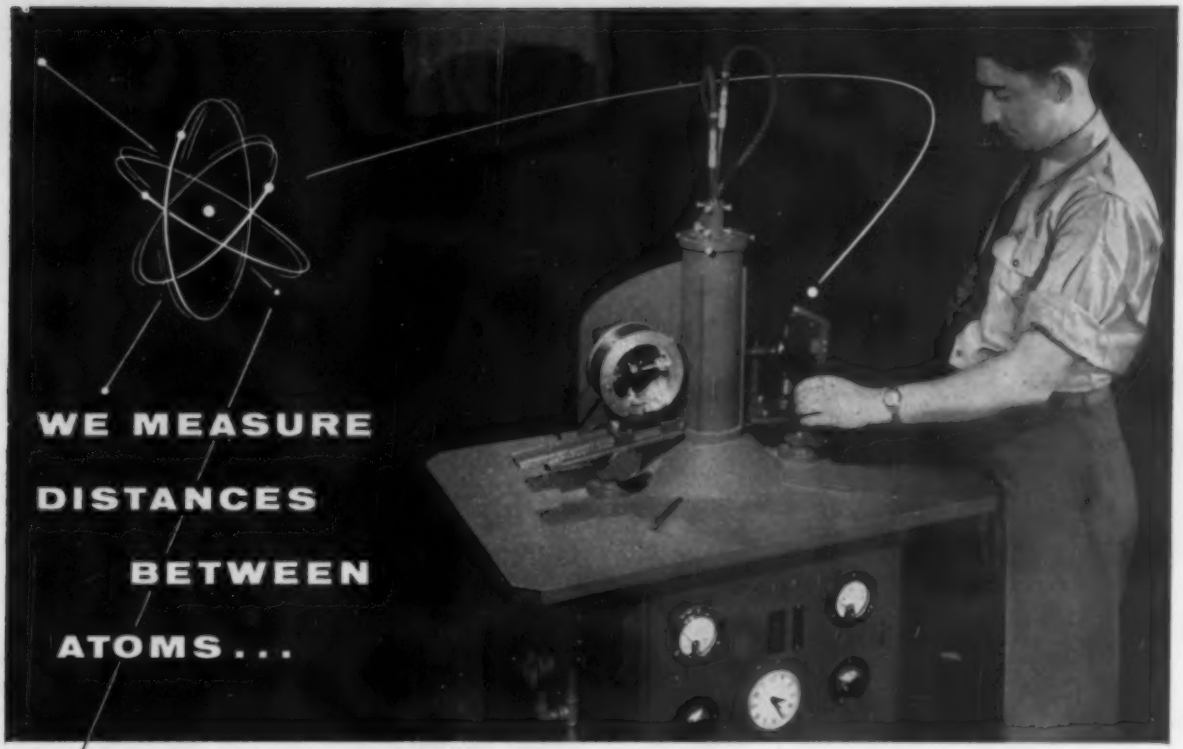
HAMILTON, ONT.

No. 1 heavy melting	43.50
No. 2 heavy melting	39.50
No. 1 bundles	43.50
No. 2 bundles	36.00
Mixed steel scrap	36.00
Mixed borings, turnings	17.00
Rails, remelting	52.50
Busheling, new factory:	
Prepared	41.50
Unprepared	37.50
Short steel turnings	21.00

Cast Iron Grades†

No. 1 machinery cast	42.00-43.00

†F.o.b., shipping point.



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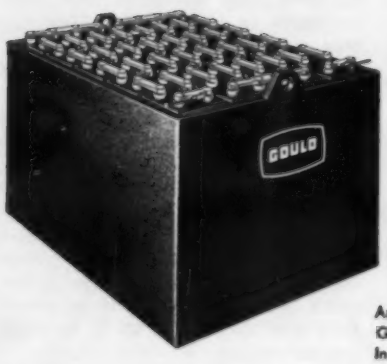

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Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.10
Mesabi nonbessemer	10.95
Open-hearth lump	12.10

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)	nom. 18.00-20.00
Brazilian iron ore, 68-69% (spot)	26.00-28.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$30.00-$31.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, $1.06-$1.11 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, 95c-$1.00.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for deliver to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $45.00-$50.00
48% 3:1	42.00-44.00
48% no ratio	34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	33.00-35.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.60-$3.85
60-65%	3.85-4.00

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

Super-Duty: St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., Hawstone, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty: Hays, Sproul, Hawstone, Pa., Warren, Windham, O., Athens, Tex., $145; Morrisville, Pa., Niles, O., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

Ladle Brick (per 1000)

Dry Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Vandalia, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Mo., $194; Danville, Ill., $197; Philadelphia, Clearfield, Pa., $201.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $241; Danville, Ill., $244; Philadelphia, Clearfield, Pa. $248.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Clearfield, Pa., Philadelphia, $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $258.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $198; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ¼-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅝-in. grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connelsville, furnace	$13.75-14.50
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Kearney, N. J., ovens	$26.75
Camden, N. J., ovens	26.50
Everett, Mass., ovens	
New England, deld.	*28.55
Chicago, ovens	27.00
Cincinnati, deld.	28.50
Terre Haute, Ind., ovens	26.75
Milwaukee, ovens	27.50
Indianpolis, ovens	26.75
Portsmouth, O., ovens	24.75
Cincinnati, deld.	27.34
Painesville, O., Ovens	27.50
Cleveland, deld.	29.43
Birmingham, ovens	24.40
Cincinnati, deld.	29.33
Erie, Pa., ovens	27.50
Buffalo, ovens	27.50
Buffalo, deld.	28.75
Lone Star, Tex., ovens	19.50
Neville Island, (Pittsburgh) Pa., ovens	25.00
Philadelphia, ovens	26.50
Swedeland, Pa., ovens	26.50
St. Paul, ovens	26.50
Detroit, ovens	27.50
Detroit, deld.	28.50
Pontiac, deld.	29.06
Saginaw, deld.	30.58

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulphate	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length (Inches)	Per 100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25

CARBON

8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

(*Concluded from Page* 105)

total drop in sales is less than was reported in 1953 and 1954.

Distributors are busy readjusting extras on sheets and bars. This follows the recent changes at the mill level. It is possible that new base prices may be established by distributors on hot-rolled sheet and hot-rolled bars.

Wire . . .

Wire Prices, Pages 98 & 99

Wire mills, closing March schedules, will operate at capacity through the first quarter in most finishing departments. Rod tonnage shipments in February will approximate those made in recent months.

Revision in pricing of wire rods and bright wire eliminates quality extras which are added to the base price.

To the extent that longer lead time is required, buying is on a more forward basis, but bulk of consumers are not inclined to speculate too heavily with a buildup of inventories.

New England springmakers, screw manufacturers and most suppliers of wire fabricated goods start this year with order backlogs heavier than in 1955. Finished wire supply is considerably tighter, with deliveries more extended than a year ago.

Stainless Steel . . .

Stainless Steel Prices, Page 100

Crucible Steel Co. of America, Pittsburgh, adjusted base prices on cold-finished stainless steel wire ½-in. in diameter and under, and on stainless steel hot-rolled wire rods (effective as of Dec. 27). New extras were announced. The changes reflect higher finishing costs of cold-finished bars and wire, Crucible announced.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 99

Pittsburgh Screw & Bolt Co. announces an increase in extra prices for track bolts. Effective Jan. 3, the extra for heat treatment of track bolts was hiked from 25 to 75 cents per 100 lb.

Company officials point out this is the first change in heat treating extras since 1917.

Import Steel Demand Strong

Recent substantial increases in imported steel prices are attributed to heavy demand and the premium prices being paid here. Tight sup-

ply is particularly noticeable in plates. European platemakers are setting more tonnage aside for shipment here, offering second quarter delivery.

Hot-rolled sheet deliveries from abroad are running three to four months; merchant bars and reinforcing steel, four months; furring channels, barbed wire and nails, six weeks; oil country pipe, five to six months. Shape deliveries also are extended.

Prices on imported pipe are largely a matter of negotiation. I-beam prices are higher, but they are nominal.

No letup in the supply stringency is anticipated for some time. Continental European mills see boom conditions for at least six months.

Structural Shapes . . .

Structural Shape Prices, Page 96

Structural fabricators anticipate active months ahead. Considerable new work is being figured as the new year gets under way.

November structural bookings, as recently reported by the American Institute of Steel Construction, climbed to the second highest level of 1955. Involving 345,308 tons, bookings were under July's total of 369,414 tons, the record for the first 11 months. November bookings represented an increase of 77 per cent over the corresponding period of 1954. Cumulative bookings through November were 3,327,712 tons, an increase of 44 per cent over the corresponding period of the preceding year.

Some of the larger shops in the East have enough work to keep them going for 12 months. Some of the medium-sized shops have work for at least seven or eight months. In the Pacific Northwest, fabricators report an average backlog of 60 days.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4355 tons, state highway bridges, including Providence river structure, North-South freeway, Providence, R.I., to Bethlehem Steel Co., Bethlehem Pa.; M. A. Gammino Construction Co., Providence, general contractor; also 1260 tons, concrete reinforcing bars.

2500 tons, power house extension, New England Power Co., Salem, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; bids direct.

1600 tons, store addition, Jordan Marsh Co., Boston, to Lehigh Structural Steel Co., Allentown, Pa.

1300 tons, transmission tower, Pennsylvania Power & Light Co., to Lehigh Structural Steel Co., Allentown, Pa.

1050 tons, plant addition, West Virginia Pulp & Paper Co., Charleston, S. C., to Bristol Steel & Iron Works Inc., Bristol, Va.

375 tons, bleach plant, the Mead Corp., Kingsport, Tenn., to Bristol Steel & Iron Works Inc., Bristol, Va.

300 tons, girders for Brownlee, Idaho, power project, railroad relocation, to Pacific Car & Foundry Co., Seattle; Morrison-Knudsen Co. general contractor.

715 tons, four beam bridges, Spaulding turnpike, Dover, N. H., to American Bridge Division, U. S. Steel Corp., Pittsburgh, through W. H. Hinman, Westbrook, Me.

655 tons, four 3-span state beam bridges, Manchester, N. H., to Bancroft & Martin Rolling Mills Co., South Portland, Me., through David Swett Co., Manchester.

280 tons, building, Harvard Trust Co., Cambridge, Mass., to A. O. Wilson Structural Co., Cambridge.

265 tons, plant building, Detroit Controls Corp., Stamford, Conn., to A. O. Wilson Structural Co., Cambridge, Mass.; Gilbane Building Corp., Providence, R. I., general contractor.

200 tons, warehouse, Ladd air base, Alaska, to Isaacson Iron Works, Seattle; S. S. Mullen Inc., Seattle, general contractor.

190 tons, Fr. Gillis priory, Boston, to A. O. Wilson Structural Co., Cambridge, Mass.

175 tons, dormitory, Brown University, Providence, R. I., to A. O. Wilson Structural Co., Cambridge, Mass.; Gilbane Building Corp., Providence, general contractor.

150 tons, microwave tower near North Bend, Wash., for Pacific Telephone & Telegraph Co., to Joseph Faught Co., Portland, Oreg.

145 tons, garage extension, Adley Express Co., Cambridge, Mass., to A. O. Wilson Structural Co., Cambridge.

140 tons, plant, Blowing Rock Chair Co., Lenoir, N. C., to Bristol Steel & Iron Works Inc., Bristol, Va.

137 tons, Idaho state Twin Falls plate girder bridge, to Bethlehem Pacific Coast Steel Corp., Seattle.

STRUCTURAL STEEL PENDING

9000 tons, comprising 8600 tons for a power plant at Eddystone, Pa., and 1000 tons for a steam plant in the Philadelphia area, Philadelphia Electric Co.; bids closed Jan. 4.

3620 tons, state bridge work, Beaver county, Pennsylvania; bids Jan. 27.

3257 tons, state bridge work, schedule No. 2, Beaver county, Pennsylvania.

2444 tons, state bridge work, Philadelphia county, Pennsylvania; bids Jan. 27.

2335 tons, state bridge work, Allegheny county, Pennsylvania; bids Jan. 27.

2000 tons, hangars, shops, operations building and tower, Air Force base, Grand Forks, N. D.; bids to Corps of Engineers, Omaha, Nebr.

1400 tons, five nosewing hangars, Elmendorf air base, Alaska; Peter Kiewit Sons Co., Seattle, apparently low $8,057,029, to U. S. Engineer; bids 11 per cent above estimates.

1250 tons, state rehabilitation center, Johnstown, Pa; Moyer Bros., Altoona, Pa., low on general contract.

950 tons, state highway bridge, Berks county, Pennsylvania; G. A. & F. C. Wagman, Dallastown, Pa., low on general contract.

750 tons, Oregon Trunk Railway's Celilo bridge, Wishram, Wash., bids Jan. 23.

245 tons, grade separation, Klamath Falls, Oregon; state project; Tom Lillebo, Reedsport, low $399 964.

115 tons, also 325 tons, steel sheet piling, Sturgeon Bay, Wis.; bids to Corps of Engineers, Chicago.

REINFORCING BARS . . .

REINFORCING BARS PLACED

650 tons, Yakima, Wash., high school to Northwest Steel Rolling Mills Inc., Seattle; Bartrum & Sandford, Eugene, Oreg., general contractor.

200 tons, Wenatchee, Wash., junior high school, to Soule Steel Co., Seattle.

193 tons, Norse Home, Seattle, to Joseph T. Ryerson & Son Inc., Seattle; Wick Construction Co., Seattle, general contractor.

100 tons, Dohrman warehouse, Seattle, to Soule Steel Co., Seattle.

REINFORCING BARS PENDING

1720 tons, state bridge work, Philadelphia county, Pennsylvania; bids Jan. 27.

930 tons, state bridge work, Allegheny county, Pennsylvania; bids Jan. 27.

775 tons, state bridge work, Beaver county, Pennsylvania, bids Jan. 27.

500 tons, state bridge work, schedule No. 1, Beaver county, Pennsylvania, bids Jan. 27; also, 274 tons, schedule No. 2.

FOR SALE OR RENT

UNIT WAGON CRANE

Model 1020, self-propelled. Capacity 10 to 15-ton, 40' boom. Mounted on 12 pneumatic tired carrier, hydraulic steering, air brakes. Excellent condition.

An ECA Guaranteed Rebuilt

Thoroughly Rebuilt from Top to Bottom

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Chicago 4, Ill., 327A So. La Salle St.
New York 7, N. Y., 30A Church St.

WANTED

WIRE DRAWING MACHINES

Intermediate and fine machines wanted, for drawing of Copper and Aluminum Wire.
Send full details of type, make, age, driven, and takeup equipment.

THE ANSONIA WIRE & CABLE CO.
ANSONIA, CONNECTICUT

WANTED

HEAT TREATING FURNACE—Continuous Rotary Retort Hardening Furnace similar to American Gas Furnace 136 or 139. Capacity 150 to 1000 lbs. per hour.

THE MELLOWES COMPANY
125 East Nash St. Milwaukee 12, Wis.

PLANT SUPERINTENDENT

Experienced Plant Superintendent for concern fabricating heavy equipment in highly machine structural steel and heavy machinery, hoists, cranes, etc. Location Central Ohio.

Reply Box 356, STEEL
Penton Building Cleveland 13, Ohio

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For Sale

FOR SALE
Approximately 100 net tons ¼" high carbon steel wire, bright basic, M.B., oil tempered, manufactured in accordance with A.S.T.M. specification A.-229-41, in coils of approximately 600 lbs. each, with inside diameter of approximately 28", located at our Wharton, N. J. plant. Price $230 per net ton. F.O.B. cars Wharton, N. J. subject to prior sale. If interested in all or any part wire or write to LOCK JOINT PIPE CO., Att: Mr. D. Lineham. 150 Rutledge Ave., East Orange, N. J. Phone ORange 5-8900.

OPPORTUNITIES AND PROFITS

are of equal interest to distributors and manufacturers—use an ad on this page next week to let manufacturers know you are interested in taking on new lines.

Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $94; 19-21% Mn, 1-3% Si, $91.50; 16-19% Mn, $89.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $205, Duquesne, Johnstown, Sheridan, Pa.; Philo, O.; Tacoma, Wash.; Aloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 30.95c per lb of contained Mn, carload packed 32c, ton lots 33.5c, less ton 34.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.35c per lb of contained Mn, packed, carload 23.4c, ton lot 25c, less ton 26.2c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 30c; 2000 lb to min carload, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.5c per lb of alloy. Packed, c.l. 12.5c, ton 12.95c, less ton 13.95c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N.Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 31.75c per lb contained Cr, 0.02 max 38.50c, 0.03% max 38c, 0.06% max 36.50c 0.1% max 36c, 0.15% max 35.75c 0.2% max 35.50c, 0.5% max 35.25c, 1.0% max 34c, 1.5% max 33.85c, 2.0% max 33.75c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 8 M x D, bulk 27.4c per lb contained Cr. Packed c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.2% min, Fe 0.2 max). Contract, carlot, packed 2"x D plate (about ⅛" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.28. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c, per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-2%). Contract, carload, lump, bulk 21.5c per lb of alloy, carload packed 22.95c, ton lot 25.25c, less ton 26.75c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.95 per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.5c per lb of briquet, c.l. packed, pallets 12.7c, bags 13.5c; 3000 lb to c.l., pallets 13.9c; 2000 lb to c.l., bags, 14.7cc, less ton 15.6c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.15c per lb of briquet, c.l. packed, pallets, 13.35c; bags 14.15c, 3000 lb to c.l., pallets, 14.55c; 2000 lb to c.l., bags, 15.35c; less ton 16.25c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags, 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.3c. Packed, pallets 7.5c; bags 8.34c; 3000 lb to c.l. pallets 9.1c; 2000 to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.33 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.30 per lb of contained W; 2000 lb W to 5000 lb W, $3.40; less than 2000 lb W. $3.52 Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

Silicax Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½ in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17.19%, Mn 8-11%). C.l. packed 17.2c per lb or alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 200 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base; carload, f.o.b. sellers' works, Mt. Pleasant, Sigio, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.54 in all sizes except powederd which is $1.66; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo. f.o.b. Langeloth, Pa.; $1.31 in cans; in bags, $1.30, f.o.b. Langeloth, Pa.; $1.24, Washington, Pa.

375 tons, Idaho state railroad overcrossing, Canyon county; Babbitt Construction Co., Boise, low $458,018.

300 tons, Washington state girder bridge, Thurston county; bids to Olympia, Jan. 17.

166 tons, Washington state undercrossing, Spokane county; bids to Olympia, Jan. 17.

PLATES . . .

PLATES PLACED

350 tons, 24 to 60-in. steel water pipe, Tacoma, Wash., to American Pipe & Construction Co., Portland, Oreg., low $1,1,983.

PLATES PENDING

750 tons, storage tanks, Elmendorf air base, Alaska; general bids in.

500 tons, hull plates, general stores supply depot, Navy, Philadelphia, bids in.

300 tons, water storage tank, Air Force base, Grand Forks, N. D.; bids to Corps of Engineers, Omaha, Nebr.

150 tons, water storage tank, Air Force base, Bryan, Tex.; bids to Corps of Engineers, Ft. Worth, Tex.

100 tons, fuel storage tank, Air Force base, Grandview, Mo.; bids to Corps of Engineers, Kansas City, Mo.

100 tons plus, additional fuel storage, Paine air base, Everett, Wash; Harold Kaeser Co., Seattle, low $119,896.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Central of Georgia, six 1750-hp diesel units, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Great Northern, 24 diesel-electric road-switching units to Electro-Motive Division, General Motors Corps., La Grange, Ill.

Wabash, six 2400-hp diesel electric units, to Fairbanks, Morse & Co., Chicago.

LOCOMOTIVES PENDING

Louisville & Nashville, 50 diesel locomotives; pending.

RAILROAD CARS PLACED

Alaska Railroad, 200 gondolas, to Warren Car Co., Warren, Pa.

Duluth, South Shore & Atlantic Railroad, 100 fifty-ton boxcars, to Pullman-Standard Car Mfg. Co., Chicago.

Erie, 500 steel boxcars, to its Meadville, Pa., shops.

Great Northern, 1250 freight cars, including 300 seventy-ton hopper cars and 200 seventy-ton gondola cars to Pullman-Standard Car Mfg. Co., Chicago; 750 fifty-ton boxcars to its own shops.

Kansas City Southern, 600 fifty-ton boxcars, to Pullman-Standard Car Mfg. Co., Chicago.

Soo Line, 806 freight cars, placed with unnamed builders. List comprises 600 fifty-ton boxcars, 200 seventy-ton ore cars and 6 seventy-ton gondola cars.

Texas & Pacific, 230 cars to its Marshall, Tex., shops; list comprises 100 fifty-ton boxcars, 100 seventy-ton gondola cars and 30 seventy-ton covered hopper cars.

Wabash, 2300 freight cars, with 400 fifty-ton boxcars going to ACF Industries Inc., New York; 900 fifty-ton boxcars to the General American Transportation Corp., Chicago; 300 fifty-ton boxcars and 100 seventy-ton covered hopper cars to Pullman-Standard Car Mfg. Co., Chicago; 400 fifty-ton boxcars and fifty 70-ft flatcars to its own shops; and 150 seventy-ton gondola cars to Bethlehem Steel Co., Bethlehem, Pa.

RAILROAD CARS PENDING

Atchison, Topeka & Santa Fe, 2450 cars, authorized. List includes 600 boxcars, 100 flat cars, 700 seventy-ton covered hopper cars, 500 seventy-ton covered hopper cars, 250 mill type gondola cars, 125 seventy-ton gondola cars and 175 seventy-ton drop-bottom gondola cars.

Chicago, Milwaukee, St. Paul & Pacific, 1000 fifty-ton boxcars, 50 fifty-ton mechanical refrigerator cars, 50 fifty-ton insulated compartmentizer-equipped boxcars and 50 fifty-ton covered hopper cars; program authorized.

RAIL EQUIPMENT PENDING

Alaska Railroad, tie plates, track bolts, etc., $495,000 order for Seward, Alaska, terminals; bids in to General Services, Seattle.

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But why MEN over 45?

Our doctors still don't know *why*, but if you are a man over 45 you are six times as likely to develop lung cancer as a man of your age twenty years ago. They *do* know, however, that their chances of saving your life could be about *ten times* greater if they could only detect cancer long before you yourself notice any symptom. (Only 1 in every 20 lung cancers is being cured today, largely because most cases progress too far before detected.)

That's why we urge that you make a habit of having your chest X-rayed every six months, no matter how well you may *feel*. The alarming increase of lung cancer in men over 45 more than justifies such precautions. Far too many men die *needlessly!*

Our new film "The Warning Shadow" will tell you what every man should know about lung cancer. To find where and when you can see this film, and to get life-saving facts about other forms of cancer, phone the American Cancer Society office nearest you or simply write to "Cancer"—in care of your local Post Office.

American Cancer Society

"Because Business Publications bring us vital news of people and products..."

says ALFRED E. PERLMAN, President, New York Central Railroad

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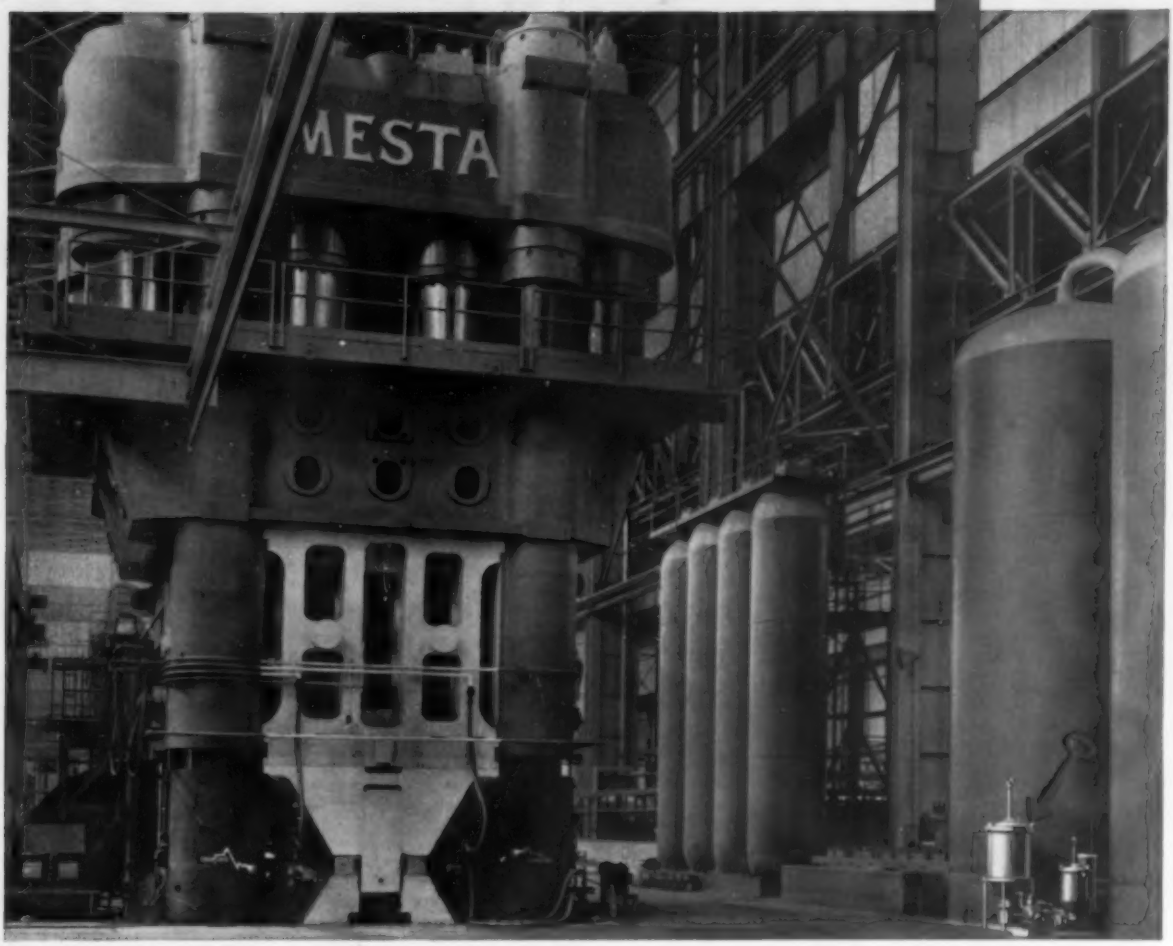
NATIONAL BUSINESS PUBLICATIONS, INC. *1413 K Street, N. W., Washington 5, D. C. • STerling 3-7535*

The national association of publishers of 173 technical, professional, scientific, industrial, merchandising and marketing magazines, having a combined circulation of 4,098,937 . . . audited by either the Audit Bureau of Circulations or Business Publications Audit of Circulation, Inc. . . . serving and promoting the Business Press of America . . . bringing thousands of pages of specialized know-how and advertising to the men who make decisions in the businesses, industries, sciences and professions... pin-pointing the market of your choice.

Write for a list of the NPB publications and the "Here's How" booklet, "How Well Will We Have to Sell Tomorrow?", written by Ralston B. Reid, Advertising & Sales Promotion Manager of the Apparatus Sales Division, General Electric Company.

Farval automatic system lubricates world's largest forging press at Alcoa

FARVAL—
Studies in Centralized Lubrication No. 185



● Pioneer in lubricating presses of all sizes, Farval was chosen to lubricate this 50,000-ton Mesta Press installed recently in the Cleveland works of the Aluminum Company of America.

With equipment of this size, the importance of a lubrication system increases many fold. It *must* be adequate. It *must* be dependable. It *must* function without shutdown. Farval fills the bill—delivering oil or grease unfailingly, in exact amounts required whenever needed. The press is protected, man hours and lubricant saved, guesswork lubrication eliminated, steady production maintained.

You will find Farval representatives ready to serve you in all major industrial centers. See how Farval pays for itself many times over—write for Bulletin 26-R. The Farval Corp., 3270 E. 80th St., Cleveland 4, O.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

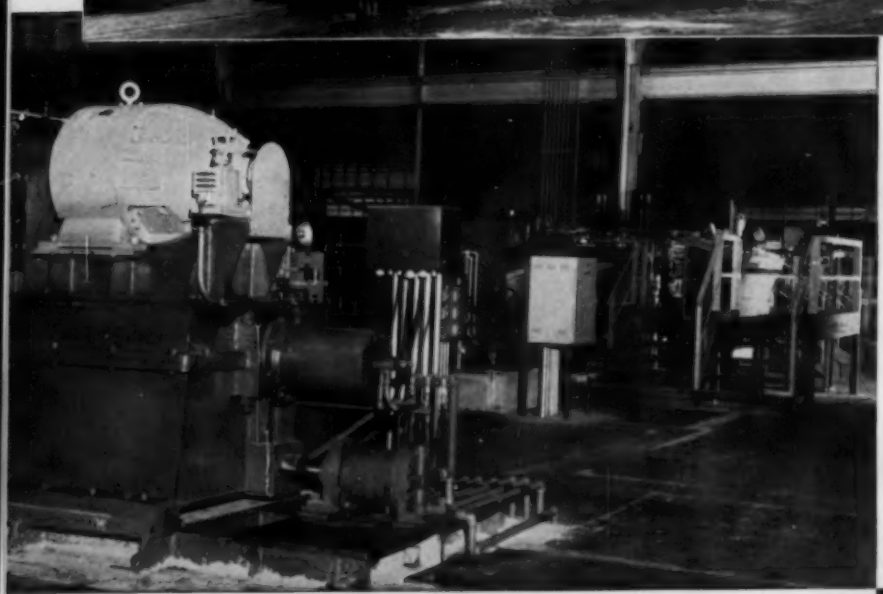
KEYS TO ADEQUATE LUBRICATION—
Wherever you see the sign of Farval—the familiar central pumping station, valve manifolds, dual lubricant lines—you know a machine is being properly lubricated.

The Farval central stations, visible at lower right, serve this 50,000-ton forging press.

FARVAL
CENTRALIZED SYSTEMS OF LUBRICATION

WEAN

SHEET, STRIP AND TIN MILL EQUIPMENT IS SPECIFICALLY DESIGNED FOR INCREASED PRODUCTIVITY



The best advertisement for any product is the testimony of a satisfied customer. When it comes to fully integrated pickling lines, Wean can point to many highly successful installations.

For example, the line in operation at the Indiana Harbor Works of the Youngstown Sheet and Tube Company (shown here) — where high grade pickling is essential—has been delivering a product of the highest quality, consistently, since installation.

When next you're considering pickling equipment why not talk it over with Wean engineers and get the one line that is designed for increased productivity, economy and ease of maintenance.

The WEAN ENGINEERING CO., INC.
WARREN, OHIO

SPECIALISTS IN SHEET, TIN AND STRIP MILL EQUIPMENT